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9. The Trichoptera (Caddisflies) of the Lesser Antilles

By Oliver S. Flint, Jr.
Curator, Division of Neuropteroids

The Trichoptera or caddisflies are one of the panorpoid orders of insects closely related to the Mecoptera and Lepidoptera. The adults are quite mothlike in appearance, but their wings are generally covered with hairs rather than scales as in the Lepidoptera. They are holometabolous with their larval and pupal stages aquatic or, in a few cases, subaquatic or terrestrial. The larvae are most frequently noticed because of their habit of constructing some sort of shelter, which in certain families is a basically tubular case that encloses most of the body and that is carried around by the larvae as they wander over the substrate. The larvae of other families construct silken retreats that are fixed to the substrate and that serve to trap food particles from the flowing water.

The trichopterous fauna of the Lesser Antilles has been almost completely ignored in the past by systematists. *Polycentropus insularis* Banks, 1938, from Grenada, is the only species described from these

[1] See list at end of paper. Other faunal studies in this series will appear in "Smithsonian Contributions to Zoology." A companion series on the flora appears in "Contributions from the United States National Herbarium" and "Smithsonian Contributions to Botany."

islands, and the only other record that has been found is for *Leptonema albovirens* (Walker) from St. Vincent (Mosely, 1933). Including these two old records with the results of the present study, we now know 3 species from Guadeloupe, 36 from Dominica, 11 from St. Lucia, 1 from St. Vincent, and 12 from Grenada. These numbers may be compared with those reported for the Greater Antilles (Flint, 1968a): 24 on Cuba, 18 on Hispaniola, 39 on Jamaica, and 35 on Puerto Rico.

ACKNOWLEDGMENTS.—The accumulation of the vast majority of the material on which this paper is based was made possible by the support of J. Bruce Bredin and John D. Archbold to whom I am most indebted. The following people all made collections, including some Trichoptera, on the island of Dominica during the course of the Bredin-Archbold-Smithsonian survey: D. F. Bray, H. H. Hobbs, H. Robinson, O. S. Flint, T. J. Spilman, P. J. Spangler, W. W. Wirth, J. F. Gates Clarke, D. M. Anderson, D. R. Davis, R. J. Gagne, A. B. Gurney, and E. L. Todd.

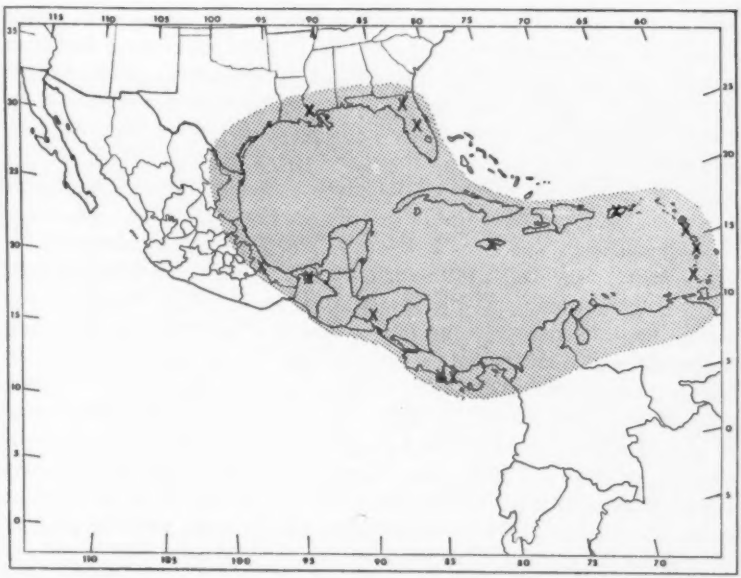
My trip to Dominica, St. Lucia, and Grenada in 1963, which resulted in the only material available from the latter two islands, was made possible by grant J–481 from the American Philosophical Society. I wish to acknowledge the help received on St. Lucia from Jason Cadet in the field and from Harold F. C. Simmons in making the necessary arrangements.

I am indebted to André D. Pizzini for the figures of the cases and habitus drawings of the larvae.

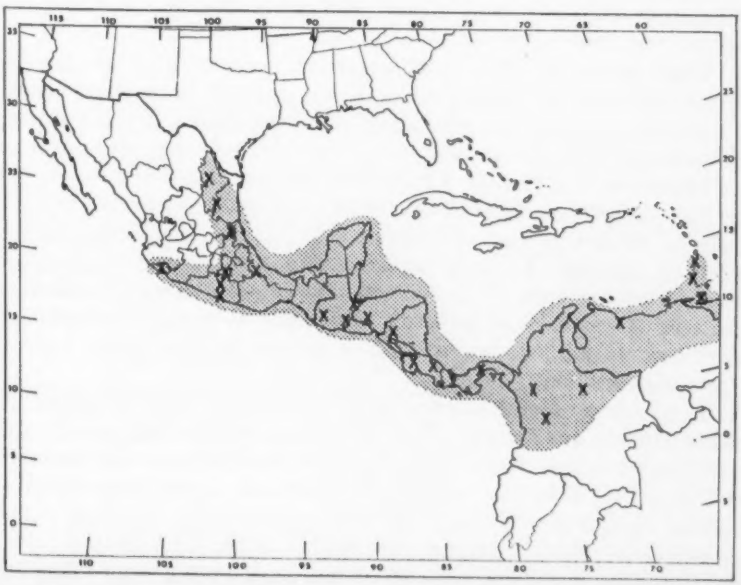
DISTRIBUTION.—One of the problems frequently faced by insect zoogeographers is the one caused by lack of adequate collecting. This results in species with enigmatic relationships because the related species have not been collected or in misleading distribution because the range is only partially known. Enough has become known, however, about the Caribbean Trichoptera in recent years so that certain general patterns can be discerned. In the following paragraphs I will attempt to point out what these patterns seem to be for the Trichoptera, with the clear understanding that additional collecting will undoubtedly require changes in certain particulars.

The majority of the Trichoptera found on the Antilles appear to be limited to these islands and, in fact, endemic to a specific island. Of the total of 45 species that are found on the Lesser Antilles, only 6 are known from the mainland as well; an additional 13 species are also found on two or more Antillean islands, leaving 26 which are known from only one Lesser Antillean island.

There seem to be three basic patterns of distribution evident in the Lesser Antillean Trichoptera. The first (map 1) is shown by *Oxyethira janella* Denning, *O. tega* Flint, *O. cirrifera* Flint, *Neotrichia*



MAP 1.—Probable distribution of *Oxyethira janella* Denning (x=records).



MAP 2.—Probable distribution of *Leptonema albovirens* (Walker) (x=records).

iridescens Flint, *Ochrotrichia spinosissima* Flint, and *Oecetis pratti* Denning. These are distributed over the Greater and Lesser Antillean islands and may also be found on some of the adjacent mainland areas. The second pattern (map 2) is shown by *Wormaldia planae* Ross, *Chimarra caribea*, new species, *Leptonema albovirens* (Walker), *Leucotrichia sarita* Ross, and *Oxyethira azteca* (Mosely). This pattern shows a rather wide mainland distribution, generally from Mexico to Trinidad, and includes Grenada and, in the case of *L. albovirens*, St. Vincent also. The third pattern is shown by the remainder of the species that are endemic to one or more of the Lesser Antillean islands.

Although the origin of the Lesser Antillean fauna is not absolutely clear, there does seem to be overwhelming evidence that there is a major difference in the composition of the Trichoptera fauna of the Greater and Lesser Antilles in spite of a few elements in common (those representatives of "pattern 1"). The following genera or groups of species are all found on the Greater Antilles but are lacking on the Lesser: *Atopsyche*, *Cariboptila*, *Campsiophora*, *Chimarra* (*Curgia*), the *Polycentropus nigriceps* group, *Antillopsyche*, the *Smicridea comma* group, *Hydropsyche*, *Macronema*, *Leptocella*, *Marilia*, and the *Phylloicus cubana* group. The alternative of genera or species groups present on the Lesser Antilles but not on the Greater is also true: *Protoptila*, *Polyplectropus*, the *Chimarra caribea* group, *Zumatrichia*, *Bredinia*, the *Smicridea nigripennis* group, *Atanatolica*, *Brachysetodes*, and the *Phylloicus lituratus* group.

There is only a little evidence concerning the actual source for the colonization of the Lesser Antilles. In the majority of cases the genera or species groups are found throughout South and Central America, but for unknown reasons they have managed to colonize only one group of islands or the other. In a few cases, however (the *Chimarra caribea* group, *Atanatolica*, *Brachysetodes*, and the *Phylloicus lituratus* group), all the related species are found in South America and southern Central America. In these cases at least, their ancestors probably came from northern South America. In fact, the second distribution pattern (Grenada and adjacent mainland) may well represent an incipient stage in the introduction of species into the Lesser Antilles from adjacent South America.

TAXONOMY.—The following keys to families were published in Flint (1964b) and were modified from Ross (1944). Designed for use with the Antillean fauna only, they use obvious external characters whenever possible. No specific determination should ever be considered definite until the genitalia have been compared with, and found identical to, the figures for the species under consideration. The families Rhyacophilidae and Odontoceridae have not been taken on the Lesser Antilles, but they are included in the keys because of their presence on the Greater Antilles.

Key to Families

LARVAE

1. Pro-, meso-, and metanotum covered by sclerotized plates 2
   Meso- and metanotum either membranous or only partially covered . . . 3
2. Abdomen with many branched gills . . . . . HYDROPSYCHIDAE
   Abdomen without gills . . . . . HYDROPTILIDAE
3. Anal proleg projecting ventrad at right angles to the body axis; inhabiting a case made of sand grains in the shape of a turtle's shell . GLOSSOSOMATIDAE
   Anal proleg extending in axis of body, or fused to last segment; either free-living, or in a differently shaped case 4
4. Anal proleg extending freely from the abdomen; either free-living, or in a fixed silken retreat 5
   Anal proleg fused to apex of abdomen, claw only free; in a freely movable house 7
5. Ninth abdominal tergum with a sclerite; free-living . . . RHYACOPHILIDAE
   Ninth segment membranous dorsally; in a fixed retreat 6
6. Labrum membranous, with anterior margin expanded laterally (T-shaped). PHILOPOTAMIDAE
   Labrum sclerotized, roughly semicircular . . . . . PSYCHOMYIIDAE
7. Labrum with a transverse row of about 20 setae dorsally; in a flat case of leaf fragments . . . . . CALAMOCERATIDAE
   Labrum with about 6 erect setae dorsally 8
8. Anal claw with a series of teeth, comblike; case coiled like a snail shell . . . HELICOPSYCHIDAE
   Anal claw with a single tooth; case tubular 9
9. Antenna about 8 times as long as broad, arising near base of mandibles . . LEPTOCERIDAE
   Antenna practically invisible, barely longer than broad . . ODONTOCERIDAE

PUPAE

1. Apex of abdomen with projecting, finger-like processes 5
   Apex of abdomen without long processes, with only the lobes containing developing genitalia 2
2. Mandibles with inner margin smooth . . . . . HYDROPTILIDAE
   Mandibles with teeth or large serrations on inner margin 3
3. Mandibles with serrations along inner margin . . . . . RHYACOPHILIDAE
   Mandible with 1 or 2 large teeth in addition to serrations 4
4. Mandible with a single large tooth on inner margin . . GLOSSOSOMATIDAE
   Mandible with 2 teeth on inner margin . . . . . PHILOPOTAMIDAE
5. Third and/or fourth abdominal segments bearing hook-plates posteriorly . . HYDROPSYCHIDAE
   Only the fifth segment bearing a hook-plate posteriorly 6
6. Seventh segment without hook-plates anteriorly 7
   Seventh segment with hook-plates anteriorly 8
7. Apical processes tipped with hairs as long as processes . HELICOPSYCHIDAE
   Apical processes either without hairs or they are much shorter than processes . . . . . LEPTOCERIDAE
8. Lateral line of setae lacking on abdomen . . . . . PSYCHOMYIIDAE
   Lateral line of setae well developed 9
9. Dorsum of abdomen with transverse brushes of setae . . CALAMOCERATIDAE
   Dorsum of abdomen without heavy brushes of setae . . . ODONTOCERIDAE

ADULTS

1. Mesoscutellum with posterior portion forming a triangular, flat area with a vertical posterior margin; forewing length 4 mm or less . HYDROPTILIDAE
   Mesoscutellum rounded, without vertical margins; forewing length 3 mm or more 2
2. Ocelli present 3
   Ocelli absent 5
3. Maxillary palpi with fifth segment 2 or 3 times as long as fourth . . . . . PHILOPOTAMIDAE
   Maxillary palpi with fifth segment barely longer than fourth 4
4. Foretibia with apical spur prominent . . . . . RHYACOPHILIDAE
   Foretibia with apical spur absent or hairlike . . . . . GLOSSOSOMATIDAE
5. Midtibia with preapical spur 6
   Midtibia without preapical spur 9
6. Terminal segment of maxillary palpi elongate, and generally with suture-like cross striae 7
   Terminal segment of palpi about same length as preceding segment, without cross striae 8
7. Mesoscutum with a pair of small setal warts; foretibia often with a preapical spur . . . . . PSYCHOMYIIDAE
   Mesoscutum without setal warts; foretibia never with a preapical spur . . . HYDROPSYCHIDAE
8. Antennae much longer than wings . . . . . LEPTOCERIDAE
   Antennae about length of forewings . . . . . HELICOPSYCHIDAE
9. Mesoscutellum small and rectangular . . . . . CALAMOCERATIDAE
   Mesoscutellum large and domelike . . . . . ODONTOCERIDAE

Family GLOSSOSOMATIDAE

Although the family is found over most of the world, the Protoptilinae, to which all the antillean species belong, is exclusively of New World distribution. The two genera known from the Greater Antilles seem to belong to a different section of the subfamily from where *Protoptila* belongs.

The larvae of the family all construct cases of small sand grains shaped like a turtle's shell. At pupation the ventral strap is cut away and the domelike dorsal covering is firmly anchored to the substrate, usually a rock, and a separate silken inner cocoon is spun to enclose the pupa.

Genus *Protoptila* Banks

Protoptila Banks, 1904, p. 215. [Type-species: *Beraea*? *maculata* Hagen, 1861, by original designation.]

The genus *Protoptila*, which contains many species and is found throughout the New World, is here recorded from the Antilles for the first time.

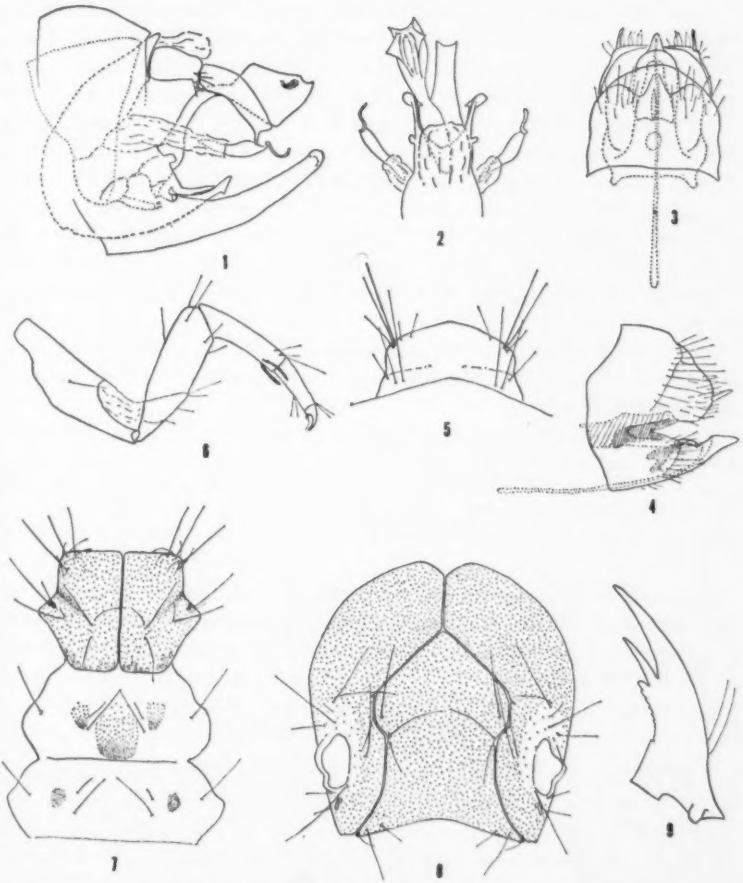
Preliminary descriptions of the larvae have been given by Ross (1944) and Flint (1963). The immature stages of the species described herein agree structurally with the other known species of the genus.

Protoptila dominicensis, new species

FIGURES 1–9

This species is a member of the *maculata* group, closest to *P. resolda* Mosely. From this species it differs in the nondivergent apices of the ninth sternum, the shape of the apical portion of the tenth tergite, and the very different aedeagus.

ADULT.—Length of forewing 3 mm. Color brown; legs paler, forewing with intermingled brown and gold hairs, a pale line at anasta-



FIGURES 1–9.—*Protoptila dominicensis*, new species: 1, male genitalia, lateral; 2, male genitalia, dorsal; 3, female genitalia, ventral; 4, female genitalia, lateral; 5, pupal labrum, dorsal; 6, larval foreleg, posterior; 7, larval thorax, dorsal; 8, larval head, anterior; 9, pupal mandible, anterior.

mosis. Male genitalia: eighth sternum elongate, tapering, tip slightly bifid; ninth sternum flattened, scooplike, tip bifid; lateral arms of tenth tergum rectangular, with a sharp apicomesal tooth; lateral process of aedeagus with a curled apical spine; aedeagus with dorsomesal lobe, basal complex, narrow neck, and greatly enlarged apex. Female genitalia: eighth sternum with rounded ventrolateral lobes; internal plate rectangular in ventral view with a circular mesal opening, apically with a smaller ventral plate, a long internal whip attached to apex.

LARVA.—Length to 4 mm. Sclerites brown, head yellowish around eyes. Prosternum with a pair of broad plates filling the venter. Meso- and metasterna with narrow sclerites along posterior margins. All legs very similar; mid- and hindlegs with ventroapical seta of tibia nonfimbriate. Abdominal segments 1–6 with 1 pair, segments 7–8 with 2 pairs of dorsal setae; segments 1–8 with a lateral seta; segment 1 with 2 pairs, segments 2–9 with 1 pair of ventral setae. Ninth tergite with 2 pairs of long setae. Anal claw with 3 pairs of accessory teeth.

PUPA.—Length 3 mm. Mandibles and labrum as in figures 5, 9. Face with 3 pairs of setae. Abdomen with hook-plates anteriorly on segments 2–8 (2 and 8 lightly sclerotized and may be lacking), posteriorly on 4.

CASE.—Length 4 mm, width 2 mm. Made of small sand grains in typical shape. Irregular respiratory openings dorsally at anterior and posterior ends.

MATERIAL.—Holotype, pharate male: Dominica, Morne Nicholls, 9 Nov. 1964, P. J. Spangler, USNM Type 69879. Allotype, female: Fond Figues, 6 Apr. 1964, O. S. Flint, Jr. Paratypes: same data as holotype, 1 ♀; same data as allotype, 1 ♀; Clarke Hall, 11–20 Feb. 1965, W. W Wirth, 1 ♀. Other: same data as holotype, 7 larvae, 1 prepupa, 6 pupae; Laudat, 20 Nov. 1964, P. J. Spangler, 1 larva.

BIOLOGY.—This species has been encountered only a few times on the island of Dominica. The larvae were found in clear, forested streams about 5 yards wide, where they were attached to gravel and rocks on the bottom.

Family PHILOPOTAMIDAE

The philopotamids are nearly ubiquitous wherever there is flowing water in most of the regions of the world. Many of the genera, including *Wormaldia*, are more or less limited to the cooler, spring-fed streams in mountainous regions, whereas others, especially *Chimarra*, are more diverse in the regions of larger, warmer, but still rapidly flowing, lowland rivers.

The larvae construct long, tubular, silken shelters attached to the underside of a rock or stick, where the flow of water will keep the

shelter distended. The pupae are enclosed in a rather loose, domed shelter of sand and silk.

Key to Genera

LARVAE

Frontoclypeus with anterior margin evenly convex . . . . . **Wormaldia**
Frontoclypeus with anterior margin asymmetrically emarginate . . . **Chimarra**

PUPAE

Mandible broad, subapical teeth close together, often arising from a single projection . . . . . **Chimarra**
Mandible narrower, teeth well separated, never arising from a single projection **Wormaldia**

ADULTS

Front tibia with 1 apical spur . . . . . **Chimarra**
Front tibia with 2 apical spurs . . . . . **Wormaldia**

Genus *Wormaldia* McLachlan

Wormaldia McLachlan, 1865, p. 140. [Type-species: *Hydropsyche occipitalis* Pictet, 1834, designated by Ross, 1949.]

There are species placed in the genus *Wormaldia* from all regions of the world save the Australian; however, the genus seems to be most diverse in the Northern Hemisphere. This is the first record of the genus from the West Indies.

Larvae and pupae of the genus were described by Ross (1944), Lepneva (1964), and others.

Wormaldia planae Ross and King

FIGURES 10, 11

Wormaldia planae Ross and King, 1956, p. 64.

This species was described from Mexico, but I have seen examples from Panama, Colombia, and Trinidad, as well as these recorded here. It is thus a circum-caribbean species, and it may also be expected in the Andean region further south.

ADULT.—Length of forewing 4 mm. Color brown, legs slightly paler. Male genitalia: no sternal processes; eighth tergum with a U-shaped dorsomesal excision, flanked by a pair of knoblike protuberances; tenth tergum narrow, with apex enlarged in lateral aspect, dorsally with an expansion and a blunt tooth laterally, then narrowing to a subapical constriction, and a sharp apicolateral tooth; cercus reaching posteriad to subapical constriction of tenth tergum; clasper with basal segment short and broad, apical segment about as long as basal segment, somewhat narrowed, with a dense apicomesal patch of black spines; aedeagus with internal sclerotizations in the form of long

lateral rods, a domelike basal hood, and an internal complex at midlength.

LARVA AND PUPA.—Unknown.

MATERIAL.—Grenada, 2 miles west of Lake Grand Etang, 4–8 Aug. 1963, O.S. Flint, Jr., 4 ♂.

BIOLOGY.—The specimens were taken at an ultraviolet light placed beside a small tumbling, mountain brook.

Genus *Chimarra* Stephens

Chimarra Stephens, 1829, p. 318. [Type-species: *Phryganea marginata* Linnaeus, 1767, by monotypy.]

This is a very large genus with species found on every region of the earth. One or more species have been found on all the Antillean islands.

The larvae have been described many times. They live in silken tubes on the undersurface of rocks in fast water.

Key to Species

LARVAE

Anterior margin of frontoclypeus with a central tooth . . . . . **C. dominicana**
Frontoclypeus without a small central tooth . . . . . **C. antilliana**

PUPAE

Mandibles with 2 separate subapical teeth . . . . . **C. dominicana**
Mandibles with 2 teeth arising from a common projection . . . . **C. antilliana**

ADULTS

1. Clasper of male with a long apicomesal projection; M in hindwing with only 2 branches . . . . . **C. dominicana**
   Claspers without a long apicomesal projection; M with 3 branches 2
2. Clasper considerably enlarged basally; female with an elongate internal, ventral sclerite . . . . . **C. caribea**
   Clasper barely broader basally; female without an elongate ventral sclerite. **C. antilliana**

Chimarra dominicana, new species

FIGURES 12–17

This species is apparently related to *C. puertoricensis* Flint. It differs in the ornamentation of the eighth tergum, the presence of

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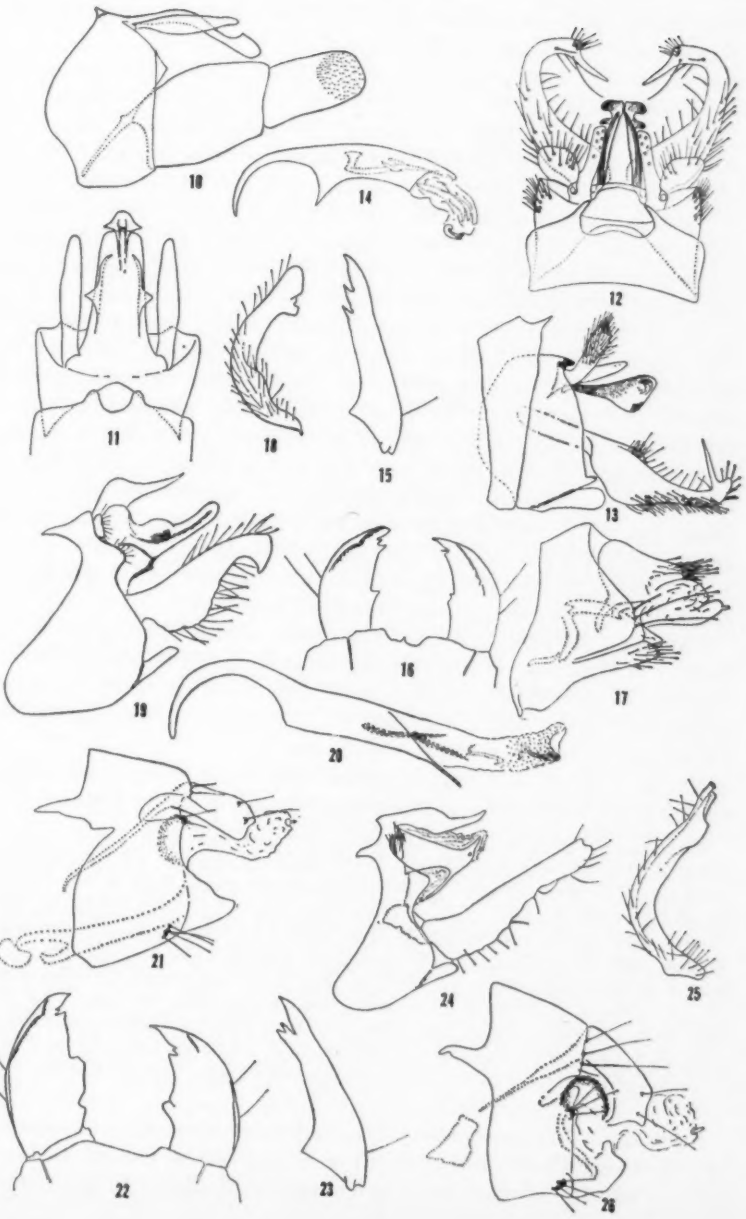
FIGURES 10–26.—*Wormaldia planae* Ross and King, male genitalia: 10, lateral; 11, dorsal. *Chimarra dominicana*, new species: 12, male genitalia, dorsal; 13, male genitalia, lateral; 14, aedeagus, lateral; 15, pupal mandible, anterior; 16, apex of larval frontoclypeus and mandibles, dorsal; 17, female genitalia, lateral. *C. caribea*, new species: 18, clasper, posteroventral; 19, male genitalia, lateral; 20, aedeagus, lateral; 21, female genitalia lateral. *C. antilliana*, new species: 22, apex of larval frontoclypeus and mandibles, dorsal; 23, pupal mandible anterior; 24, male genitalia, lateral; 25, clasper, posteroventral; 26, female genitalia, lateral.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two apical teeth on the ventral half of the tenth tergum, and the long apicomesal process of the clasper.

The larvae and pupae are attributed to this species on circumstantial evidence. Adults of two species of *Chimarra* have been taken on Dominica and the adults and larvae of *C. antilliana* have been definitely associated by means of metamorphotypes. By elimination, therefore, the larvae herein described must be those of *C. dominicana*.

ADULT.—Length of forewing 4 mm. Color fuscus, coxae and femora slightly paler. Vein M in hindwing with 2 branches. Male genitalia: eighth tergum with a broad mesal excision, lateral angles of which are developed into elongate points; ninth sternum with a short, terete apicomesal process; tenth tergum divided mesally, each side divided again into dorsal and ventral lobes; dorsal lobe rodlike, ventral lobe widened apically with two apicolateral teeth; cercus elongate; clasper slender and elongate, with a long apicomesal process; aedeagus (partially everted) with a pair of small dark apicoventral spines, and a longer pair of spines, a basal ring and rod with a pair of lateral wings. Female genitalia: eighth segment without anterolateral processes; posterior margin with a rounded lateral lobe bearing three large setae, ventral surface truncate; ninth tergum with a short anteroventral process, and a pair of dorsoapical lobes; bursa copulatrix consisting of several elongate sclerotized straps.

LARVA.—Length to 8 mm. Sclerites pale yellowish brown, posterior margin of pronotum black. Anterior margin of frontoclypeus with a slightly asymmetrical emargination that bears a short, pointed process centrally. Left mandible with a short pointed molar tooth, right mandible with a small molar area.

PUPA.—Length 5 mm. Mandibles with inner margin serrulate, with 2 large teeth. Apex of abdomen with a few bristly hairs.

MATERIAL.—Holotype, male: Dominica, .4 miles east Pont Casse, 6 May 1964, O. S. Flint, Jr., USNM type 69880. Allotype, female: 2.2 miles east of Pont Casse, 11 May 1964, O. S. Flint, Jr. Paratypes: Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 1♂4♀; same, but 8 Apr. 1964, 3♀; same, but 23 Apr. 1964, 1♂1♀; same, but 17 June 1964, 1♀; Pont Casse, .4 miles east, 21 Apr. 1964, O. S. Flint, Jr., 2♀; same, but 27 Apr. 1964, 5♂1♀; same, but 6 May 1964, 1♂5♀; same, but 23 June 1964, 2♀; Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr., 1♀; same, but 12 May 1964, 1♀; same, but 18 May 1964, 1♀; same, but 11 June 1964, 1♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 1♂; same, but 14 Apr. 1964, 1♀; Pont Casse, 27–30 Nov. 1964, P. J. Spangler, 1♀. Other: D'leau Gommier, 27 Apr. 1964, O. S. Flint, Jr., 4 larvae, 2 prepupae, 1 pupa.

BIOLOGY.—This species has been taken at elevations of around 2000 feet near Pont Casse and on the central divide. Larvae believed to be of this species were taken in a small, rapid stream on the underside of rocks in the bottom gravel.

Chimarra antilliana, new species

FIGURES 22–26

This species is clearly related to the following new species as is shown by the structure of the tenth tergum and aedeagus. It may be recognized by the more elongate, narrower clasper, which bears subapically a thin mesal shelf.

ADULT.—Length of forewing 4–5.5 mm. Color fuscus; coxae and femora pale brown. Vein M in hindwing with 3 branches. Male genitalia: eighth tergum unmodified; ninth sternum with a short terete apicomesal process; tenth tergum with a dorsomesal flaplike process, lateral lobe with a long straplike apicoventral process and a short apicodorsal one; cercus short, rounded; clasper elongate, straight, and barely widened basally in lateral aspect; in ventral aspect, bowed outwardly, with a narrow shelflike mesal projection subapically; aedeagus with 2 internal spines, a scabrous pouch with a darkened rounded lobe, and basal rod and ring. Female genitalia: eighth segment completely divided dorsomesally, with anterolateral processes, posterior margin with a few large setae; ninth tergum with long anterolateral processes; bursa copulatrix consisting of a heavily sclerotized ring basally, and apically of a nearly vertical plate capped dorsally by a hoodlike structure.

LARVAE.—Length to 9 mm. Sclerites yellowish brown, posterior margin of pronotum black. Anterior margin of frontoclypeus asymmetrically emarginate. Left mandible with enlarged molar area and blunt tooth, right mandible with arcuate molar area and basal tooth.

PUPA.—Length 4–5-mm. Mandibles with inner margin serrulate, with a large subapical, bifid tooth.

MATERIAL.—Holotype, male: Dominica, Mannett Gutter, near Clarke Hall, 4 April 1964, O. S. Flint, Jr. USNM Type 69881. Allotype, female: same data. Paratypes: same data, 4♂; same, but 10 Mar. 1965, W. W. Wirth, 1♂; Clarke Hall, 11–20 Jan. 1965, W. W. Wirth, 1♂; same, but 18–19 Jan. 1965, J. F. G. Clarke, 2♀; same, but 27 Jan. 1965, 1♀; same, but 1–10 Feb. 1965, W. W. Wirth, 1♂; same, but 10 Feb. 1965, J. F. G. Clarke, 1♂; same, but 11–20 Feb. 1965, W. W. Wirth, 1♀; same, but 21–28 Feb. 1965, 1♂; same, but 21–31 Mar. 1965, 3♂ 4♀; same, but 31 Mar. 1965, D. R. Davis, 1♂; same, but 1 June 1964, O. S. Flint, Jr., 1♂; same, but 9 June 1964, 1♀; same, but 3–8 Oct. 1964, P. J. Spangler, 1♀; same, but 1–7 Dec. 1964, 1♂ 5♀; Fond Figues, 23 Jan. 1965, W. W. Wirth, 1♀; same, but 9–13 Mar. 1965, 17♂ 16♀; same, but 16–17 Mar. 1964, D. F. Bray, 2♂ 5♀; same, but 6 Apr. 1964, O. S. Flint, Jr., 60♂ 63♀; same, but 7 May 1964, 7♂, 44♀; same, but 1 May 1965, D. R. Davis, 1♂ 2♀; same, but 10 June 1964, O. S. Flint, Jr., 42♂ 221♀; same, but 1 Dec. 1964, P. J. Spangler, 1♀; Pagua Bay, 19 Nov. 1964, P. J. Spangler, 1♂; Cabrit Swamp, 3 Nov. 1964, P. J. Spangler, 1♀; Clarke Hall, 1 mile east, 4 Apr. 1965, D. R. Davis, 13♂ 2♀; same, but 19 Apr. 1965, 5♂ 2♀; same, but 22 May 1965, 4♂; Layou Valley (upper bridge), 22–25 July 1963, O. S. Flint, Jr., 8♂; Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 1♂; Mahaut, Oct. 1966, E. L. Todd,

1♂; Syndicate Estate, 5 Mar. 1964, D. F. Bray, 1♀; Pont Casse, 12 Jan. 1965, J. F. G. Clarke, 1♀; Pont Casse, 2.5 miles north, 8 Apr. 1965, D. R. Davis, 8♀; Pont Casse, 3.5 miles north, 5 Dec. 1964, P. J. Spangler, 2♂ 104♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 5♂ 1♀; same, but 2 May 1964, 7♂ 2♀; same, but 7 May 1964, 4♂ 3♀; same, but 11 May 1964, 1♂ 4♀; same, but 6 June 1964, 8♂ 1♀; same, but 19 June 1964, 2♀; Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr., 1♀; same, but 10 May 1964, 4♂ 5♀; same, but 12 May 1964, 3♂ 13♀; same, but 18 May 1964, 2♀; same, but 11 June 1964, 1♂ 1♀; Pont Casse, .4 mile east, 27 Apr. 1964, O. S. Flint, Jr., 1♀; Pont Casse, .5 mile south, 8 Apr. 1964, O. S. Flint, Jr., 3♂ 3♀; same, but 11 Apr. 1964, 2♂ 3♀; same, but 17 June 1964, 2♀; same, but 22–24 July 1963, 16♂ 3♀; Pont Casse, 1.6 miles west, 28 Apr. 1964, O. S. Flint, Jr., 3♂; same, but 16 June 1964, 1♂ 4♀; Pont Casse, 3 miles east, 13–16 Oct. 1966, A. B. Gurney, 1♀; same, but 23 Oct. 1966, E. L. Todd, 1♂ 9♀; same, but 26 Oct. 1966, 1♀; La Ronde River, 15 Feb. 1964, H. Robinson, 1♀; Trafalgar, 21 May 1965, D. R. Davis, 2♂ 1♀; La Plaine, 23 Nov. 1964, P. J. Spangler, 1♀. St. Lucia: Vergallier River near Marquis, 31 July 1963, Flint and Cadet, 2♀; same, but 2 Aug. 1963, 1♀; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 21♂ 15♀. Other: Dominica: Roseau River, swift water, 16 June 1911, 12 larvae; Springfield River, Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 8 larvae, 3 prepupae, 2 pupae, 1♂ 1♀ metamorphotypes; Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., 5 larvae; same, but 15 June 1964, 1 pupa, 1♂ metamorphotype; Pont Casse, .5 mile south, 22–24 July 1963, O. S. Flint, Jr., 1 larva, 1 prepupa, 3 pupae; Rosalie, 30 Nov. 1964, P. J. Spangler, 1 larva, 2 prepupae; Belfast River, .75 mile above mouth, 31 Jan. 1964, H. H. Hobbs, Jr., 11 larvae; Batali River, north of Salisbury, 21 Feb. 1964, R. Zusi and H. H. Hobbs, Jr., 1 larva; Espagnole River, cascades on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 1 larva; Fond Figues, 1 Dec. 1964, P. J. Spangler, 2 larvae, 3 pupae, 3♂ metamorphotypes; Deux Branches, 30 Nov. 1964, P. J. Spangler, 2 larvae, 1♀ metamorphotype; Pagua Bay, 19 Nov. 1964, P. J. Spangler, 2 larvae. St. Lucia: Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 8 larvae, 1 prepupa, 1 pupa, 3♂ metamorphotypes; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 12 larvae, 2 pupae, 1♀ metamorphotype.

Biology.—This species is one of the most frequently encountered Trichoptera on Dominica and St. Lucia. It has been taken in the larger lowland rivers and the small tumbling mountain brooks. The immature stages were taken under stones in the fast water of riffles and cascades.

Chimarra caribea, new species

Figures 18–21

This species appears to be the same as the one I have from the island of Trinidad and to be extremely close to *C. duckworthi* Flint from Costa Rica. The differences from the latter species lie in the narrower lateral lobes of the tenth tergites and the slightly more elongate clasper with a prominent thumblike apicomesal lobe in *C. caribea*. Additional material from Venezuela and Colombia may show these differences to be clinal, but for the present I consider them specifically distinct. *Chimarra antilliana* is also related, but very distinct in the shape of both the clasper and the tenth tergum.

ADULT.—Length of forewing 4.5–5 mm. Color fuscus; coxae and femora yellowish brown. Vein M of hindwings 3 branched. Male genitalia: ninth sternum with an elongate, terete, apicomesal process; tenth tergum with a dorsomesal flaplike lobe, lateral lobe with a darkened slightly protruding area at midlength bearing sensillae, ventrally with a pair of straplike sclerites articulating beneath aedeagus; clasper elongate, enlarged basoventrally, apex enlarged, curved mesally, with a thumblike, subapical projection; aedeagus with a spinelike apicoventral lip, a scabrous sac with darkened pouch, two spines, and ring and rod. Female genitalia: eighth segment divided dorsomesally, with anterolateral processes, posterior margin with a few enlarged setae; ninth tergum with very long anterolateral processes; bursa copulatrix with a basal ring, elongate ventral plates, and a dorsal hoodlike structure.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: Grenada, 2 miles west of Lake Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., USNM Type 69882. Allotype, female: same data. Paratypes: same data, 14♂ 3♀. Other: Trinidad, Simla, Arima Valley, 9–12 Feb. 1966, S. S. and W. D. Duckworth, 6♂; same, but 13–19 Feb. 1966, 11♂; same, but 20–26 Feb. 1966, 6♂.

BIOLOGY.—The adults were collected on Grenada beside a small (3 feet wide by 3–6 inches deep) tumbling, mountain brook. It is assumed that the larvae were living in the same stream although none were found.

Family PSYCHOMYIIDAE

The psychomyiids are found throughout the world. Although most species breed in flowing water, there are a number that breed in lentic situations. The genera *Xiphocentron*, *Cernotina*, and *Polycentropus* are found throughout the Antilles although the species of the latter genus on the Greater Antilles are not closely related to the Lesser Antillean species. The West Indian endemic genus *Antillopsyche* is limited to the Greater Antilles, but the widespread genus *Polyplectropus* has not been found on these islands.

The immature stages of most genera make flimsy silken nets to trap their prey although certain others make long silken tubes affixed to the substrate. The pupae are generally sheltered in a domelike case of silk and sand.

Key to Genera

LARVAE

1. Tibia and tarsus fused; a broad flat process extending anteriorly from the mesopleuron . . . . . **Xiphocentron**
   Tibia and tarsus not fused; no process from mesopleuron 2
2. Mandibles with dorsal row of teeth overhanging ventral row 3
   Mandibles with dorsal row not overhanging ventral row . . . **Polycentropus**

3. Head with dark muscle scars; anal claw with large ventral teeth. **Polyplectropus**
Head uniformly pale; anal claw without ventral teeth . . . . . **Cernotina**

PUPAE

1. Tip of mandible hooked; apical process with 4 setae . . . . . **Xiphocentron**
Tip of mandible not hooked; apical process with many setae 2
2. Apical process with about 10 setae; gills absent . . . . . **Cernotina**
Apical process with many more than 10 setae; gills present . . **Polycentropus**

ADULTS

1. Foreleg with preapical spur 2
Foreleg without preapical spur 3
2. Hindwing with R_2 and R_3 fused to wing margin . . . . . **Polyplectropus**
Hindwing with R_2 separating from R_3 before wing margin . . **Polycentropus**
3. Anterior scutal warts of mesonotum delimited by a distinct lateral suture; general color black . . . . . **Xiphocentron**
Anterior scutal warts without lateral sutures; general color yellowish. **Cernotina**

Genus *Xiphocentron* Brauer

Xiphocentron Brauer, 1870, p. 66. [Type-species: *Xiphocentron bilimeki* Brauer, 1870, by monotypy.]

Species of the genus are found from southwestern United States south through South America. All the Antillean islands intensively collected for Trichoptera have proven to support one or two species.

The immature stages were described by Edwards (1961) and Flint (1964b). The adults of the genus are generally diurnal and rarely attracted to lights, which accounts in part for their scarcity in collections.

Key to Species

ADULTS

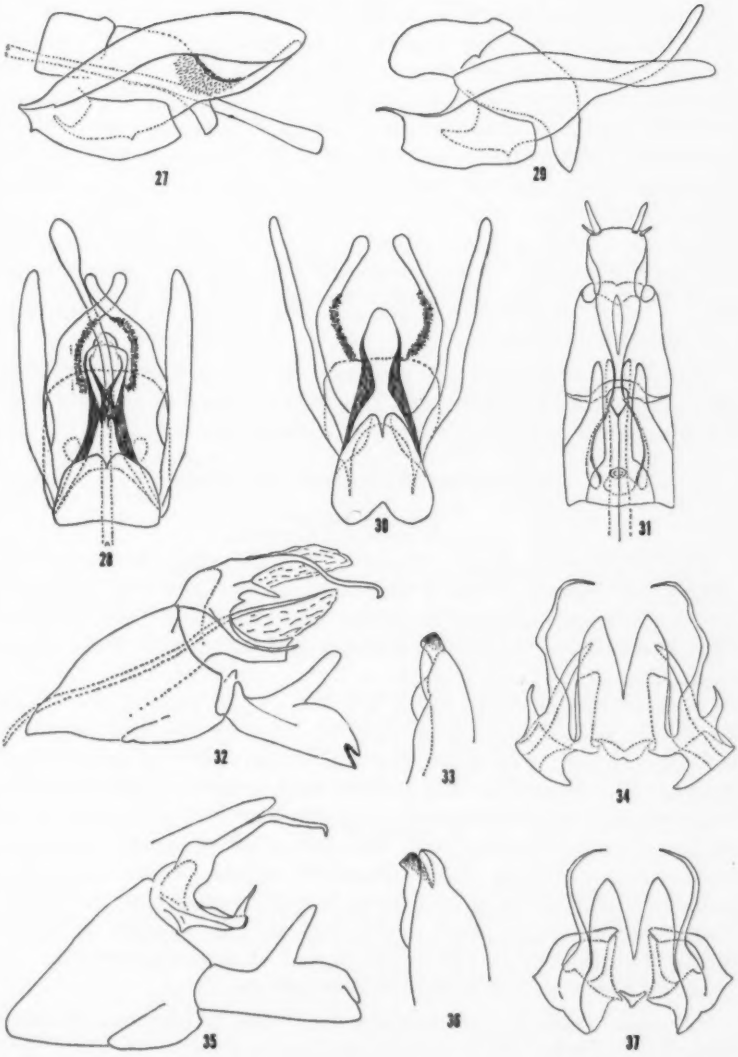
Color totally black . . . . . **X. fuscum**
Color black, with a line of white hairs along the posterior margin of the forewings. **X. albolineatum**

Xiphocentron fuscum, new species

FIGURES 27, 28

The species seems to be closest to *X. borinquensis* Flint from Puerto Rico. From this it differs in the apically widened cerci, much shortened anterior process of the ninth sternum, and differently shaped mesal lobes of the ninth tergum.

ADULT.—Length of forewing 3.4–4 mm. Color fuscus, coxae and femora pale brown, hairs on face ventrad of antennae pale brown. Apical spur of hindleg in male about ½ length of basal tarsal segment. Male genitalia: ninth sternum with anterolateral process short and blunt, posterior margin truncate; ninth tergum rectangular in lateral aspect, posterior margin with a V-shaped mesal incision; tenth



FIGURES 27–37.—*Xiphocentron fuscum*, new species, male genitalia: 27, lateral; 28, dorsal. *X. albolineatum*, new species, male genitalia: 29, lateral; 30, dorsal. *Cernotina lutea*, new species: 31, female genitalia, ventral; 32, male genitalia, lateral; 33, apex of clasper, ventral; 34, male tenth terga and cerci, dorsal. *C. cadeti*, new species, male: 35, genitalia, lateral; 36, tip of clasper, ventral; 37, tenth terga and cerci, dorsal.

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tergum sclerotized laterally, tip decurved; cercus about 10 times as long as broad, widened subapically; clasper with apical portion narrow and sharply curved dorsomesally, mesally with many dark spicules; aedeagus very long, slightly enlarged apically. Female genitalia: eighth segment divided dorsally with long anterolateral processes; ninth segment long and slender with long anterolateral processes; apex of tenth segment with a pair of slender papillae.

LARVA AND PUPA.—See *Xiphocentron* species.

MATERIAL.—Holotype, male: Dominica, Brantridge, 9 May 1964, O. S. Flint, Jr., USNM type 69883. Allotype, female: same data. Paratypes: same data, 5♂; same, but 30 April 1964, 12♂; Pont Casse, .4 miles east, 7–8 May 1964, O. S. Flint, Jr., 19♂; Pont Casse, 2.5 miles east, 16 Jan. 1965, W. W. Wirth, 1♂; Pont Casse, 1.5 miles north, 12 Feb. 1965, W. W. Wirth, 1♂.

BIOLOGY.—Apparently this species is limited to the higher elevations on the island of Dominica. I have swept them in numbers from rocks in nearly dry streambeds around Pont Casse.

Xiphocentron albolineatum, new species

FIGURES 29, 30

This is a species closely related to the preceding, from which it differs in possessing a line of white hairs along the posterior margin of the forewings and mesally on the head. The male genitalia differ most noticeably in the narrower clasper and the more elongate dorsomesal lobes of the ninth tergum.

ADULT.—Length of forewing 3–4 mm. Color fuscus, coxae and femora slightly paler, posterior margin of forewing, pro- and mesonota, and head mesally with a band of whitish hairs. Apical spur of hind tibia of male about ½ as long as basal tarsal segment. Male genitalia: ninth sternum with anterolateral process long and attenuate; ninth tergum rounded basally, with dorsomesal lobes slightly elongate; tenth tergum with tip sharply decurved; cercus slender, narrowing apically, about 12 times as long as broad; apex of clasper slender, sharply curved dorsomesad, mesal surface with elongate spiculate patch. Female genitalia: identical to that of preceding species.

LARVA AND PUPA.—See *Xiphocentron* species.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.7 miles east, 12 March 1965, W. W. Wirth, USNM type 69884. Allotype, female: near Clarke Hall, 13 Feb. 1964, D. F. Bray. Paratypes: Pont Casse, 12 Oct. 1964, P. J. Spangler, 1♀; Mannett Gutter, 7 March 1965, W. W. Wirth, 1♀.

BIOLOGY.—This species is known only from Dominica but appears to be more widespread on the island than the preceding. It undoubtedly has a slightly different habitat preference, which unfortunately is unknown.

Xiphocentron species

I list here the immature stages of this genus that I have collected on the Lesser Antillean islands. Characters have not been found that will serve to separate the larvae of the various species; therefore, they are all listed together and described as a unit.

LARVA.—Length to 8 mm. Sclerites pale yellow, oral margin of head capsule darker. Structure apparently identical to other described species.

PUPA.—Unknown.

CASE.—A long silken tube attached to the substrate, generally a rock, often in great numbers crisscrossing the rocks both above and below the water line.

MATERIAL.—Dominica, Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 4 larvae; same, but 15 June 1964, 1 larva. Springfield Estate, .5 miles east, 21 July 1963, O. S. Flint, Jr., 1 larva. Pont Casse, 2.2 miles east, 15 June 1964, O. S. Flint, Jr., 2 larvae. Fond Figues, 6 April 1964, O. S. Flint, Jr., 2 larvae. Mannett Gutter, 23 April 1964, O. S. Flint, Jr., 2 larvae. St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 2 larvae.

Genus *Cernotina* Ross

Cernotina Ross, 1938, p. 136. [Type-species: *Cernotina calcea* Ross, 1938, by original designation.]

The genus is widely distributed in North and Central America and in the Greater Antilles.

The immature stages of the genus still have not definitely been correlated with the adult. It seems probable, however, that the larvae and pupae described by Flint (1964b) from Puerto Rico as an unknown Polycentropodinae belong to a species of this genus.

Key to Species

ADULTS

Ventrolateral lobe of cercus of male with tip bent sharply dorsomesad . **C. cadeti**
Ventrolateral lobe of cercus spinelike . . . . . **C. lutea**

Cernotina lutea new species

FIGURES 31–34

Cernotina lutea is a member of the calcea section of the genus closest to *C. ohio* Ross. From this species it differs in the elongate mesal lobe and in the long ventrolateral spines of the cerci.

ADULT.—Length of forewing 3.5–4 mm. Color yellowish brown, a slightly paler band of hairs mesally on head and thorax. Male genitalia: ninth segment expanded basoventrally; tenth tergites elongate, conical,

and semimembranous; cercus developed dorsally into a long slender, mesally curving process that bears on outer surface near base a short tooth and ventrolaterally a long curving spine; mesoventrally developed into an elongate quadrate plate; clasper with prominent dorsal arm, tip bifid; aedeagus semimembranous, with a heavily sclerotized dorsomesal rod. Female genitalia: lateral lobes of eighth sternum elongate and slender; dorsally with a transverse sclerite between ninth and tenth segments; bursa copulatrix with an elongate ventral plate and a ringlike sclerite between dorsolateral rods.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr., USNM Type 69885. Allotype, female: same data. Paratypes: same, but 10 May 1964, 1 ♀; Pont Casse, .4 miles east, 15 June 1964, O. S. Flint, Jr., 1 ♀; same, but 23 June 1964, 2 ♂ 1 ♀; Brantridge, 30 April 1964, O. S. Flint, Jr., 1 ♀; Cabrit Swamp, 23 Feb. 1965, W. W. Wirth, 1 ♂.

BIOLOGY.—The adults have generally been taken near small streams at higher elevations on the island of Dominica. Presumably the larvae will be found in these streams. The one specimen from Cabrit Swamp probably represents an individual that wandered considerably from its breeding site.

Cernotina cadeti, new species

FIGURES 35–37

As to be expected, this species is clearly related to the preceding. It may be recognized by the lack of external teeth, by the more sharply angulate ventral spine of the cerci, and by the more mesally displaced dorsal plate at the tip of the clasper.

ADULT.—Length of forewing 3 mm. Color in alcohol, uniformly pale brown. Male genitalia: ninth segment considerably expanded basoventrally; tenth tergites conical, semimembranous; cercus developed into a long curving dorsal process and a ventrolateral spine whose tip is sharply angulate dorsomesad; mesoventral process elongate, rodlike; clasper with a dorsal arm; tip bifid, with dorsal plate displaced mesally; aedeagus semimembranous, with a long dorsomesal sclerite.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, USNM Type 69886.

BIOLOGY.—The specimen was taken at a light near a slowly flowing stream about a yard wide, in which the larva probably developed.

Genus *Polyplectropus* Ulmer

Polyplectropus Ulmer, 1905, p. 103. [Type-species: *Polyplectropus flavicornis* Ulmer, 1905, by monotypy.]

Ecnomodes Ulmer, 1911, p. 17. [New synonymy. Type-species: *Ecnomodes buchwaldi* Ulmer, 1911, by monotypy.]
Cordillopsyche Banks, 1913, p. 238. [Type-species: *Cordillopsyche costalis* Banks, 1913, by monotypy.]
Ecnomodellina Ulmer, 1962, p. 5. [Replacement name for *Ecnomodes* Ulmer 1911. New synonymy.]
Genus C Flint, 1964a, p. 476.

Species from tropical America, Africa, and the Orient have been placed in this genus; however, I expect that many of those from the Old World are not truly congeneric. On the basis of adult morphology, the genus is close to *Polycentropus;* indeed, most North American workers have not recognized the two as distinct.

The adults of this genus may be recognized by the fusion of R_2 and R_3 in the hindwing and generally by the division of the clasper in the male into distinct dorsolateral and ventromesal lobes. The larvae have the mandibles with the dorsal row of teeth overhanging the ventral row, the tibia and tarsus of the fore- and midlegs have a row of enlarged and generally black setae on the posterior face, and the anal claw bears several long teeth ventrally.

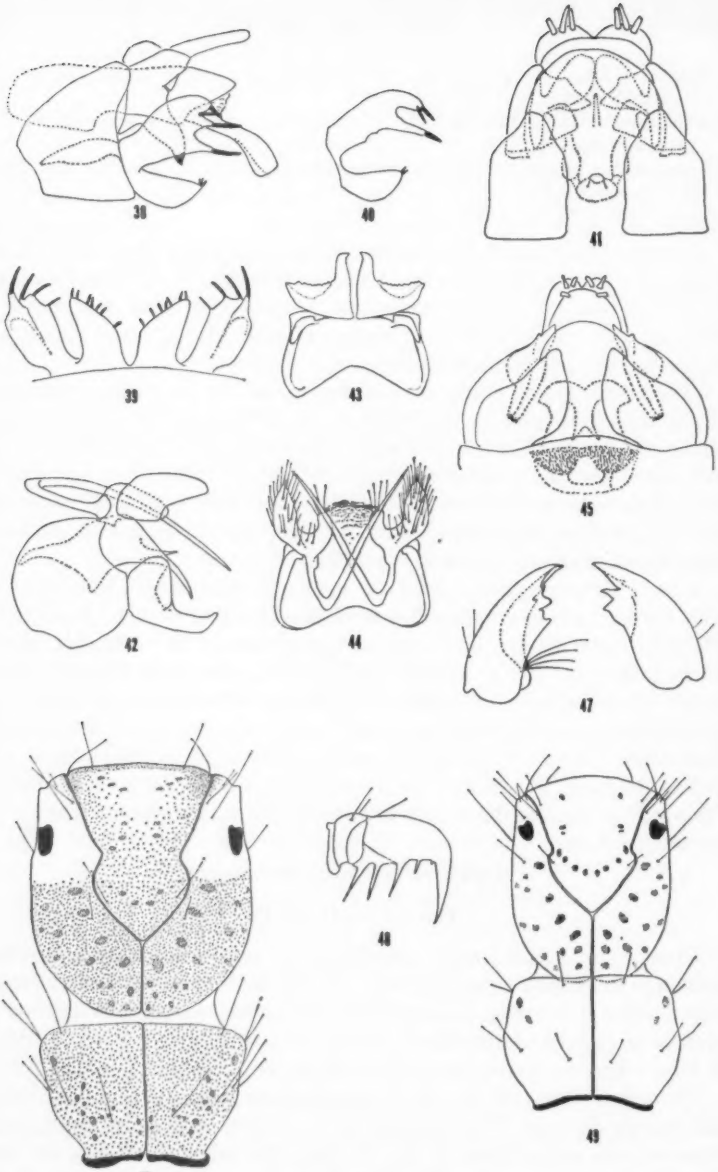
I have already synonymized the genus *Cordillopsyche* (Flint, 1967), and am here synonymizing *Ecnomodellina* (=*Ecnomodes*) Ulmer with *Polyplectropus* Ulmer. The original description of *E. buchwaldi* leaves little doubt that it is a typical species of *Polyplectropus.* The following New World species, mostly described in *Polycentropus,* must be transferred to *Polyplectropus* (all new combinations): *Ecnomodes buchwaldi* Ulmer, *Polycentropus charlesi* Ross, *P. santiago* Ross. *P. thilus* Denning, *P. alleni* Yamamoto, *P. altmani* Yam., *P. deltoides* Yam., *P. elongatus* Yam., *P. laminatus* Yam., *P. robacki* Yam., *P. recurvatus* Yam.

Polyplectropus bredini, new species

FIGURES 38–41, 47–49

This species seems quite unrelated to any other known species although there may be a slight relationship to *P. charlesi* (Ross). From this species it is easily distinguished by the more distinctly bipartite clasper that bears large black spines. The species is named for Mr. J. Bruce Bredin, a cosponsor of the Dominica Survey.

The relationship of the island populations is very close, but slight differences do exist. The males from St. Lucia have only three dark setae on the dorsal lobe of the clasper; the other dark seta on the Dominican specimens is pale. The Grenadan male (fig. 40) also has only three dark setae, but the ventralmost one is on an elongate process. Considering, the overall similarity however, I am considering these all one species.



FIGURES 38–49.—*Polyplectropus bredini*, new species: 38, male genitalia, lateral; 39, claspers, ventral; 40, clasper of Grenadan specimen, lateral; 41, female genitalia, ventral. *Polycentropus insularis* Banks: 42, male genitalia, lateral; 43, male genitalia, ventral; 44, tenth terga and cerci, dorsal; 45, female genitalia, ventral; 46, larval head and pronotum, dorsal. *Polyplectropus bredini*, new species, larva: 47, mandibles, dorsal; 48, anal claw, lateral; 49, head and pronotum, dorsal.

ADULT.—Length of forewing 5–5.5 mm. Color light brown, with whiter hairs middorsally, anterior margin of forewing dark brown. Male genitalia: ninth sternum moderately rounded basally; tenth tergites developed as long terete processes; cercus with a rounded dorsolateral lobe, posteroventrally developed into a sharp point; clasper divided into a thin, concave upper lobe bearing 4 short, broad, black setae, generally on elongate bases; basal lobe scooplike with a distal row of short dark setae; aedeagus with apicoventral portion developed into an elongate, narrow, hoodlike process. Female genitalia: lateral lobes of eigth sternum broad; subgenital plate produced and rounded apically; bursa copulatrix with a complex of sclerites apically, and a donut-shaped mesal structure.

LARVA.—Length to 8 mm. Head and pronotum pale brown with conspicuous dark muscle scars. Labrum, maxillolabium, and legs as illustrated by Flint (1964a, fig. 4). Mandibles with dorsal row of teeth overhanging ventral row. Basal segment of anal proleg with a few short setae mesally; claw with 3 long and 1 short ventral teeth, apex curved at right angles.

PUPA.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr. USNM Type 69887. Allotype, female: Syndicate Estate, 5 March 1964, D. F. Bray. Paratypes: same as holotype, but 11 June 1964, 1 ♂; same, but 12 May 1964, 1 ♂; Fond Figues, 13 March 1965, W. W. Wirth, 1 ♂; D'leau Gommier, 24 Feb. 1965, J. F. G. Clarke, 5 ♀. Other: Grenada, 2 miles west Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., 1 ♂. St. Lucia, Cul de Sac River, at mile post 9, 29 July 1963, Flint and Cadet, 1 ♂; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 1 ♂, 8 larvae.

BIOLOGY.—The adults generally have been collected near small clear streams. The larvae were taken on St. Lucia in a stream only a few feet wide by several inches deep. They were found under rocks near the head or tail ends of pools in the stream.

Genus *Polycentropus* Curtis

Polycentropus Curtis, 1835, pl. 544. [Type-species: *Polycentropus irroratus* Curtis, 1835, by original designation.]

Polycentropus, as it is presently recognized by most North American workers, is found over most of the world; however, it seems to be best developed in the Northern Hemisphere. There is at least one species on all the Antillean islands.

The larvae of the genus are well known and described. They build various types of silken trap nets.

Polycentropus insularis Banks

FIGURES 42–46

Polycentropus insularis Banks, 1938, p. 302.—Fischer, 1962, p. 83.—Flint, 1967, p. 6.

Polycentropus insularis was described from Grenada, but the specimens collected on Dominica do not seem to differ significantly from the type. The species is rather distantly related to the other species of Antillean *Polycentropus*. From these it may be recognized by the lack of dorsomesal process on the clasper and the elongate ventromesal lip of the aedeagus.

ADULT.—Length of forewing 7–8 mm. Brown, body and wings flecked with spots of golden hair. Male genitalia: ninth segment rounded in lateral aspect; cercus divided into a dorsolateral ovate lobe bearing a smaller mesal lobe, and a long, angled, pointed process; clasper with a rounded dorsolateral lobe, and an elongate ventromesal section; aedeagus with a long pointed ventromesal lip. Female genitalia: lateral lobes slightly elongate, directed apicomesally; subgenital plate rounded apically; bursa copulatrix complex, with a heavily sclerotized basal plate and lateral supports.

LARVA.—Length to 12 mm. Sclerites pale brownish, muscle scars conspicuously darker, head irregularly clouded with darker brown. Structure typical of other West Indian species.

PUPA.—Unknown.

MATERIAL.—Holotype, male: Grenada, Grand Etang, Sept. 1910, Allen and Brues, collection MCZ. Other: Dominica, Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 1 ♂, 1 larva; Pont Casse, .4 miles east, 21 April 1964, O. S. Flint, Jr., 1 ♀; same, but 27 April 1964, 1 ♂; same, but 6 May 1964, 3 ♀; same, but 16 May 1964, 1 ♀; same, but 12 June 1964, 1 larva; same, but 23 June 1964, 1 ♂; Pont Casse, 1 mile east, T. M. and J. F. G. Clarke, 2 ♂; Pont Casse, 1.3 miles east, 29 April 1964, O. S. Flint, Jr., 1 ♀; same, but 10 May 1964, 1 ♀; same, but 18 May 1964, 1 ♀; same, but 26 May 1964, 1 ♂; same, but 11 June 1964, 1 ♂ 1 ♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 1 ♂; Pont Casse, 3 miles east, 15 Oct. 1966, E. L. Todd, 1 ♀; Sylvania Estate, 28 Jan. 1965, T. M. and J. F. G. Clarke, 1 ♀; Boeri Lake, 22 Feb. 1964, D. F. Bray, 2 ♂; Freshwater Lake, 13 Oct. 1964, P. J. Spangler, 1 larva.

BIOLOGY.—The species has been taken only at higher elevations on the islands. Larvae were found sparingly in small streams. The two adults taken at Boeri Lake and the larva from Freshwater Lake indicate that the species may breed in high elevation lakes as well.

Family HYDROPSYCHIDAE

The Hydropsychidae are a very common and widely distributed family, breeding in flowing waters throughout the world. Representatives of two subfamilies, the Macronematinae and Hydropsychinae,

have been found on the Antilles. *Leptonema* and *Smicridea*, respectively, are the representatives throughout the Antilles, but *Macronema* and *Hydropsyche* are found only on the Greater Antilles.

The larvae construct a complex silken trap-net to strain their food from the water. The trap-net is attached to a tubular retreat in some crevice of the substrate. At pupation time a domelike shelter is constructed of silk with included sand or organic matter.

Key to Genera

LARVAE

Gills consisting of a long central stalk giving rise to many lateral filaments. **Leptonema**
Gills branching into filaments near base . . . . . **Smicridea**

PUPAE

Hook-plate present posteriorly on segment 3 only . . . . . **Leptonema**
Hook-plates present posteriorly on segments 3 and 4 . . . . . **Smicridea**

ADULTS

Antennae at least twice as long as wing; large and pale green . . . . **Leptonema**
Antennae subequal to forewings; small and dark . . . . . **Smicridea**

Genus *Smicridea* McLachlan

Smicridea McLachlan, 1871, p. 134. [Type-species: *Smicridea fasciatella* McLachlan, 1871, by designation of Milne, 1936.]

Smicridea is a genus of many species found from the southwestern United States to the southern tip of South America and Australia. All of the Antillean islands support at least one species. The larvae and pupae have been described on several occasions (Ross 1944, Flint 1964b).

Key to Species

PUPAE

Hook-plate 3P equidimensional with 3 long hooks . . . . . **S. cariba**
Hook-plate 3P nearly twice as wide as long, with 5 hooks . . . . . **S. simmonsi**

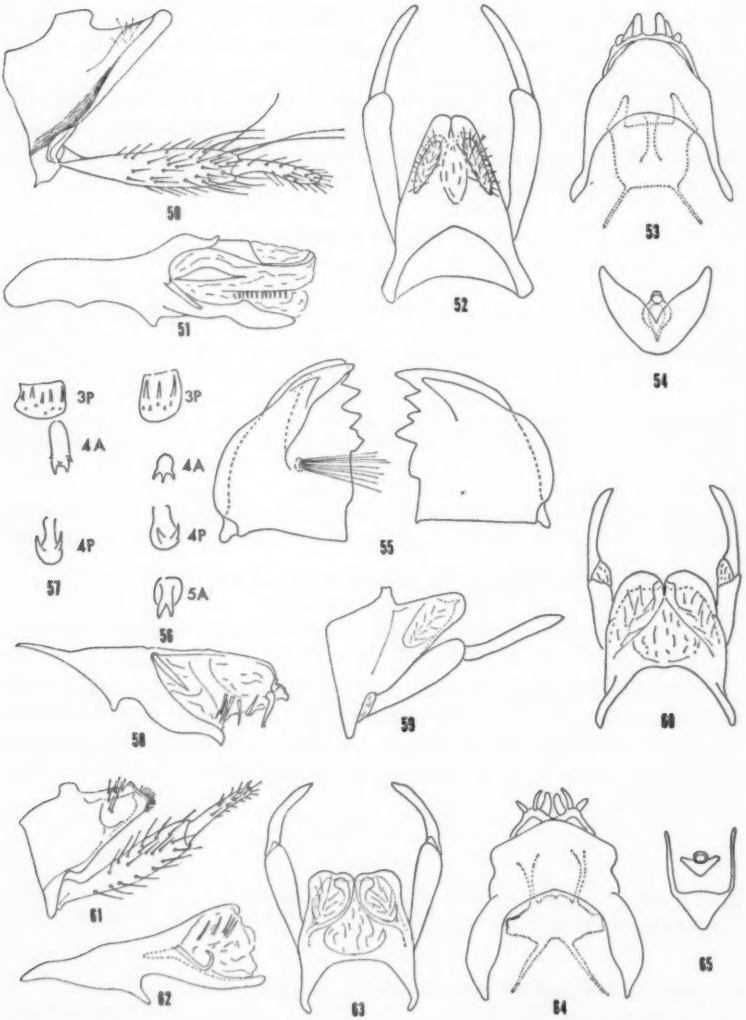
ADULTS

1. Forewing black with 2 transverse bands of white setae 2
   Forewing uniformly grayish . . . . . **S. grenadensis**
2. Tenth tergite short and broad, aedeagus without lateral plate . . **S. simmonsi**
   Tength tergite long and narrow, aedeagus with lateral plate . . . **S. cariba**

Smicridea cariba, new species

FIGURES 50–56

This species, found on Dominica, is most closely related to the following species from St. Lucia. It differs strikingly in the structure of the tenth tergite and aedeagus.



FIGURES 50–65.—*Smicridea caribea*, new species: 50, male genitalia, lateral; 51, aedeagus, lateral; 52, male genitalia, dorsal; 53, female genitalia, dorsal; 54, bursa copulatrix, dorsal; 55, larval mandibles, dorsal; 56, pupal hook-plates, dorsal. *S. simmonsi*, new species: 57, pupal hook-plates, dorsal; 58, aedeagus, lateral; 59, male genitalia, lateral; 60, male genitalia, dorsal. *S. grenadensis*, new species: 61, male genitalia, lateral; 62, aedeagus, lateral; 63, male genitalia, dorsal; 64, female genitalia, dorsal; 65, bursa copulatrix, dorsal.

ADULT.—Length of forewing 4–5 mm. Color fuscus, leg bases slightly paler, forewing with a transverse band of iridescent white hair at level of anastamosis and another halfway to wing base, apical fringe white. Sixth and seventh segments of male with internal reticulate sacs. Male genitalia: ninth segment with anterior margin angulate at middle; tenth tergite elongate, rounded apically, with lateral margin heavily sclerotized; clasper widening uniformly to apex of basal segment, apical segment terete; aedeagus large and complex, apicoventrally heavily sclerotized and scooplike, a ventrally directed spine laterally at midlength, a short dorsal hood, a flat lateral plate in apical membrane that bears 2 rows of short spines and an apicodorsal angulate rod. Female genitalia: lobes of eighth sternum slightly longer than broad, evenly rounded apically; ninth segment without clasper groove or receptacle, with anterolateral angle greatly enlarged; internal plate with a quadrate central section bearing short apical arms and a pair of long basal arms; bursa copulatrix with a central ring and broad basolateral wing-like supports.

LARVA.—Length to 7 mm. Sclerites brownish. Each gill on basal abdominal segments with 3–4 filaments. Abdomen with many short, broad, black setae.

PUPA.—Length 4–5 mm. Right mandible with 3 inner teeth, left with 4. Hook-plates anteriorly on segments 2–8, posteriorly on 3 and 4; posterior plates about equidimensional, anterior plates with 2–3 teeth, apex of posterior plates considerably elevated above body. Apical processes widely separated, with a brush of setae on apical third.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 2.2 miles east, 2 May 1964, O. S. Flint, Jr., USNM Type 69888. Allotype, female: same data. Paratypes: same data, 8♂ 4♀; same, but 14 April 1964, 1♂; same, but 1 May 1964, 7♂ 3♀; same, but 7 May 1964, 1♂ 5♀; same, but 11 May 1964, 1♂; same, but 21 May 1964, 1♀; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 2♂ 1♀; same, but 12 May 1964, 6♂ 1♀; same, but 18 May 1964, 1♀; same, but 11 June 1964, 1♀; Pont Casse, .4 miles east, 21 April 1964, O. S. Flint, Jr., 1♂; same, but 27 April 1964, 2♂; same, but 6 May 1964, 4♂ 1♀; same, but 7 May 1964, 1♂; same, but 15 June 1964, 1♂; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 2♂ 1♀; Sylvania, 9 Feb. 1964, D. F. Bray, 1♂; Trafalgar Falls, 15 March 1964, D. F. Bray, 1♂ 1♀; Fond Figues, 23 Jan. 1965, W. W. Wirth, 1♀; D'leau Gommier, 15 Feb. 1965, W. W. Wirth, 1♂. Other: Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., 8 larvae; Pont Casse, .4 miles east, 20 May 1964, O. S. Flint, Jr., 2 larvae; same, but 12 June 1964, 8 larvae; same, but 25 June 1964, 3 larvae, 1 prepupa, 1 pupa; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 36 larvae, 2 prepupae, 16 pupae, 2♀ metamorphotypes; same, but 15 June 1964, 6 larvae, 4 pupae, 1♀ metamorphotype; D'leau Gommier, 27 April 1964, O. S. Flint, Jr., 5 larvae, 1 pupa; Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 1 larva, 1 pupa; Roseau River, swift water, 16 June 1911, 5 larvae; Espagnole River, cascades on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 1 larva; Boeri Lake, outlet, 10 Nov. 1964, P. J. Spangler, 4 larvae.

BIOLOGY.—The species is most abundant around the small, tumbling mountain brooks; however, the collection of larvae in the Roseau River suggests that they breed sparingly in the large lowland rivers as well.

Smicridea simmonsi, new species

FIGURES 57–60

This species appears to be most closely related on the basis of male genitalia to *S. grenadensis*, although in coloration it is apparently the same as *S. cariba*. From *S. grenadensis* it may be separated by the more evenly rounded apices of the tenth tergites, by the straight lateral process of the aedeagus, and by the very long apical segment of the clasper,

ADULT.—Length of body 4.5 mm, forewing probably about 5 mm. Wing dark with a transverse white band at region of anastamosis, apparently some white obliquely along the base of Cu. Sixth and seventh abdominal segments of male with internal reticulate sacs. Male genitalia: ninth segment with a pronounced dorsolateral angle; tenth tergite short, broad, apex rounded; basal segment of clasper short, apical segment subequal in length; aedeagus with well-developed ventral scoop, lateral spine straight, no lateral plate, dorsal hood semimembranous, membranous portion with about 6 pairs of long spines, apex with a crenulate crecentic hood above an elongate U-shaped sclerite.

LARVA.—Length to 7 mm. No differences found from the larva of *cariba*.

PUPA.—Length 4.5 mm. As in *S. cariba*, except hook-plate 3P almost twice as wide as long and with 5 hooks.

MATERIAL.—Holotype, pharate male: St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, USNM Type 69889. Other: same data, 22 larvae, 1 pupa; Grand Riviere du Mabouya, 29 July 1963, Flint and Cadet, 1 larva; Cul de Sac River at mile post 9, 29 July 1963, Flint and Cadet, 2 larvae, 1 prepupa, 1 pupa; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 32 larvae, 1 prepupa, 3 pupae.

BIOLOGY.—The larvae of this species are most abundant in the small clear streams on the island of St. Lucia, but they are also found in the larger rivers in smaller numbers.

Smicridea grenadensis, new species

FIGURES 61–65

This species, known only from Grenada, is most closely related to *S. simmonsi* of St. Lucia; however, it is nearly unicolorous, and and in the male the tenth tergite bears a distinct anteapical bulge,

the basal segment of the clasper is longer, and the lateral spine of the aedeagus is hooked.

ADULT.—Length of forewing 4–4.5 mm. Color uniform grayish brown. Males with two pairs of ovoid internal sacs in abdominal segments 6 and 7. Male genitalia: ninth segment with pronounced dorsolateral angle; tenth tergite short, blunt, with anteapical dorsal bump; clasper with apical segment about half as long as basal segment; aedeagus with a strong ventral scoop, lateral spine hook-shaped, membranous portion with about 6 pairs of long spines. Female genitalia: lobes of eighth sternum slightly longer than broad, produced apicomesally; ninth segment without clasper groove or receptacle, greatly produced anterolaterally; internal plate with central part narrowly quadrangular, with long posterior and anterior arms, anterior pair arising mesally; bursa copulatrix with a central heart-shaped plate with a central hole, lateral supports U-shaped.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: Grenada, 2 miles west Lake Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., USNM Type 69890. Allotype, female: same data.

BIOLOGY.—The adults were taken beside a small tumbling mountain brook in which the larvae are probably to be found.

Genus *Leptonema* Guerin

Leptonema Guerin, 1843, p. 396. [Type-species: *Leptonema pallidum* Guerin, 1843, by monotypy.]

This is a genus of many species throughout the American tropics and Africa. Species are known from Cuba and Puerto Rico on the Greater Antilles.

The larvae have been described previously (Flint, 1964b).

Key to Species

LARVAE

Coxa of foreleg with anteroapical process short and with setae on anterior margin . . . . . **L. archboldi**

Coxa of foreleg with process longer but without setae . . . . . **L. albovirens**

ADULTS

Males with a very long, basally directed process from apex of aedeagus; females with a shallow groove laterally on 9th segment . . . . . **L. archboldi**

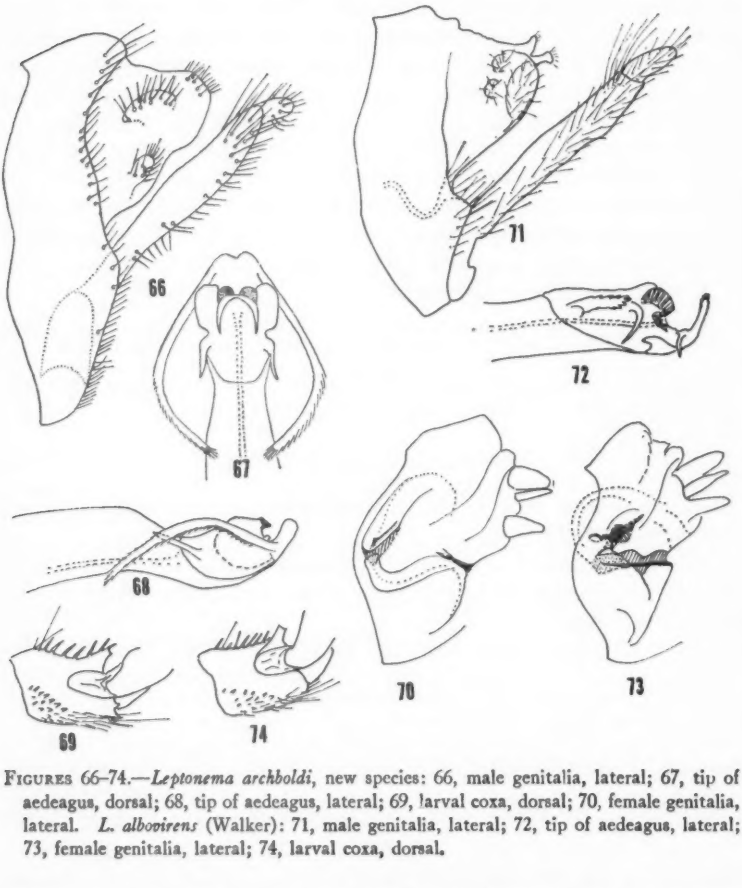
Males with a short lateroventrally directed process from apex of aedeagus; females with a deep, complex lateral groove on 9th segment . . **L. albovirens**

Leptonema archboldi, new species

FIGURES 66–70

This species is very distinct, not being closely related to any described species. It probably belongs to the stigmosum section of the

genus, from which it may be separated by the lack of the spot of dark hair on the forewing and the longer apical and shorter lateral processes of the aedeagus. I take pleasure in naming this species for Mr. John D. Archbold, one of the sponsors of this survey.



FIGURES 66–74.—*Leptonema archboldi*, new species: 66, male genitalia, lateral; 67, tip of aedeagus, dorsal; 68, tip of aedeagus, lateral; 69, larval coxa, dorsal; 70, female genitalia, lateral. *L. albovirens* (Walker): 71, male genitalia, lateral; 72, tip of aedeagus, lateral; 73, female genitalia, lateral; 74, larval coxa, dorsal.

ADULT.—Length of forewing: male 12–13 mm, female 14–15 mm. Color pale green when alive, becoming brownish after death. Female with a yellow cellule on 1A of hindwing. Male genitalia: ninth segment narrow, slightly produced dorsomesally; tenth tergite broadly triangular, with a produced hirsute knob near ventral angle, and a setose patch dorsally; clasper long and slender, without basomesal process, basal segment with rows of spinelike setae apicomesally,

apical segment short with many spinelike setae mesally; aedeagus angled near base, with a long, basally directed, fimbriate process arising apically, a short fimbriate process subapically, and a dorsomesal stub arising from a semicircular basal structure. Female genitalia: lobes of eighth sternum about ⅔ as broad as long; ninth segment with clasper receptacle shallow, entered from above, a narrow groove on surface ventrad to receptacle; with an indistinct angulate plate internally whose attachment to posterior margin of ninth segment is heavily sclerotized.

LARVA.—Length to 20 mm. Head and pronotum dark reddish brown, meso- and metanota paler, pale around eyes and on posterior of head. Anteroapical process of forecoxa short, with setae on anterior margin. Body covered densely with broad, erect, or decumbent, black setae.

PUPA.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., USNM Type 69891. Allotype, female: Pont Casse, 2.2 miles east, 2 May 1964, O. S. Flint, Jr. Paratypes: same data as holotype, but 8 April 1964, 1♂1♀; same, but 23 April 1964, 1♀; same data as allotype, but 14 April 1964, 1♂ 3♀; same, but 1 May 1964, 1♀; same, but 7 May 1964, 1♀; same, but 11 May 1964, 2♀; same, but 21 May 1964, 2♀; Pont Casse, 3 miles east, 26 Oct. 1966, E. L. Todd, 2♀; Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr. 1♀; Pont Casse, .4 miles east, 27 April 1964, O. S. Flint, Jr., 1♀; Boeri Lake, 10 May 1964, P. J. Spangler, 1 ♀; Pont Casse, 2.5 miles north, 8 April 1965, D. R. Davis, 3 ♀. Other: Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 1 larva; same, but 16 Feb. 1964, H. H. Hobbs, Jr., 1 larva; Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., many larvae, 2 prepupae; same, but 15 June 1964, 1 larva, 1 prepupa; Espagnole River, Cascade on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 3 larvae; Morne Nicholls, 9 Nov. 1964, P. J. Spangler, 2 larvae.

BIOLOGY.—This species seems to be restricted to the fast waters of small highland streams, and it may also breed around the rocky margins of Boeri Lake. The larvae make typical trap-nets and sand-enclosed retreats. Pupation takes place in a silk and sand cocoon attached tightly to a rock in the substrate.

Leptonema albovirens (Walker)

FIGURES 71–74

Macronema albovirens Walker, 1852, p. 76.
Leptonema albovirens (Walker).—Mosely, 1933, p. 45.—Fischer, 1963, p. 166.

The species is known from the extreme northeast of Mexico throughout Central America, across northern South America to Trinidad, and north in the Lesser Antilles to Grenada and St. Vincent. I give only a few more pertinent references to this species; a complete bibliography is to be found in Fischer (1963).

The species is related to *L. dissimile* Mosely, from which it differs in the much shorter apical process of the aedeagus. The following descriptions are based on Grenadan specimens.

ADULT.—Length of forewing: male 11 mm, female 12–14 mm. Color pale green. Female with a yellowish cellule on vein 1A in hindwing. Male genitalia: ninth segment narrow, posterior margin angulate above base of clasper; tenth tergite trianguloid in lateral view, with an apical setate patch, dorsoapically with 2 short processes; clasper long and slender, no mesobasal lobe; basal and apical segments with patches of short spinelike setae mesoapically; aedeagus with apex bearing 2 pairs of fimbriate processes, a ventrally directed process basad of gonopore, and a posteriorly directed fimbriate process appressed to side of aedeagus. Female genitalia: lobes of eighth sternum about ¾ as broad as long; ninth segment with a shallow pouchlike dorsally directed receptacle and a lateral groove with a heavily sclerotized ventral margin leading to a rounded internal plate.

LARVA.—Length to 17 mm. Head and thoracic notae brown, paler around eyes and posteriorly on head. Process anteroapically on forecoxae arising from inner margin, with setal row passing anteriorly of it. Abdomen covered very densely with erect or decumbent broad, black setae.

PUPA.—Unknown.

MATERIAL.—Grenada, Lake Grand Etang, 4–6 Aug. 1963, O. S. Flint, Jr., 2 ♀. Lake Grand Etang, 2 miles west, 4–8 Aug. 1963, O. S. Flint, Jr., 1 ♂ 2 ♀, 2 larvae. Great River, Balthazar, 8 Aug. 1963, O. S. Flint, Jr., many larvae. St. Vincent, 2 ♂ 1 ♀ recorded by Mosely, 1933, p. 47 and verified by Kimmins (pers. comm.).

BIOLOGY.—The larvae have been taken in both a small tumbling mountain brook and a riffle in a large lowland river. Both, however, are clear and rapid with a bottom of rocks and gravel.

Family HYDROPTILIDAE

This family contains the smallest species of the order. Most of the adults are only a millimeter or two long with the largest reaching about five millimeters. The Lesser Antilles contain at least 23 species in 8 genera, or 50 percent of the total species in the order from these islands.

The larvae undergo hypermetamorphosis in which the first four instars are slender, bear long setae, are free living, and are brief in duration. In the fifth instar, the larvae construct their cases and undergo the greater part of their growth, often changing their shape radically.

Since the cases show good generic differences—except between *Leucotrichia* and *Zumatrichia*, and between *Hydroptila* and *Ochrotrichia*—they are more useful in the placement of the pupal stage than the pupae themselves, which are only slightly different. In the majority of the genera it is impossible to key the immature stages to species. The larvae and pupae of *Bredinia* are unknown.

Key to Genera

LARVAE AND CASES

1. Larvae with abdominal terga bearing sclerites; case flattened and tightly appressed to substrate, never movable 2
   Larvae with a sclerite on ninth tergum only; case variously shaped, but carried by larva and attached at pupation 4
2. Abdominal segments 3–6 greatly enlarged; case ovoid, domed, with openings at both ends 3
   No abdominal segment enlarged; case nearly circular, flat, with marginal openings . . . . . **Alisotrichia**
3. Ninth tergum with short, enlarged setae . . . . . **Zumatrichia**
   Ninth tergum with only normal hairlike setae . . . . . **Leucotrichia**
4. Mid- and hindlegs about 3 times as long as forelegs; case silken, anterior end cylindrical, becoming enlarged and compressed posteriorly . . . **Oxyethira**
   All legs of about same length; case generally with some sand or organic matter, differently shaped 5
5. Anal prolegs projecting freely from abdomen; case tubular, made of sand . . . . . **Neotrichia**
   Anal prolegs fused to end of abdomen; case compressed 6
6. Metanotum with anterolateral angle enlarged . . . . . **Ochrotrichia**
   Metanotum with anterolateral angle not enlarged . . . . . **Hydroptila**

ADULTS

1. Ocelli present 2
   Ocelli absent . . . . . **Hydroptila**
2. Mesoscutellum with a transverse suture between lateral angles 3
   Mesoscutellum entire 9
3. Foretibia with an apical spur 4
   Foretibia without an apical spur 6
4. Males with basal antennal segment enlarged, covering face, with 2 ocelli . . . . . **Zumatrichia**
   Basal antennal segment unmodified, with 3 ocelli 5
5. Forewing fuscus, with linear, bright green marks . . . . . **Leucotrichia**
   Forewing fuscus, sometimes with silvery-gray blotches **Ochrotrichia (Metrichia)**
6. Midtibia with a preapical spur 7
   Midtibia without a preapical spur 8
7. Male genitalia not greatly modified, claspers large and easily recognizable as such . . . . . **Ochrotrichia (O.)**
   Male genitalia greatly modified, claspers small and often difficult to homologize . . . . . **Alisotrichia**

813-152—68——3

8. Male with basal antennal segment enlarged, covering face, 2 ocelli **Alisotrichia**
   Male with antennae unmodified, 3 ocelli . . . . . **Bredinia**
9. Hindtibia with only a preapical spur . . . . . **Neotrichia**
   Hindtibia with 2 preapical spurs 10
10. Metascutellum narrow, almost quadrangular . . . . . **Alisotrichia**
    Metascutellum wider, distinctly triangular . . . . . **Oxyethira**

Genus *Zumatrichia* Mosely

Zumatrichia Mosely, 1937, p. 187. [Type-species: *Zumatrichia filosa* Mosely, 1937, by original designation.]

The genus has heretofore been known only from several Mexican species. The genus is closely related to *Leucotrichia*, but the males differ greatly in the modified basal antennal segment, in the possession of only two ocelli, and in a different style genitalia.

The immature stages of the genus are herein described for the first time, and as expected they show a close relationship to those of *Leucotrichia*. The larvae of *Zumatrichia* are distinguished by the short, broad, setae on the eighth and ninth terga.

Key to Species

ADULTS

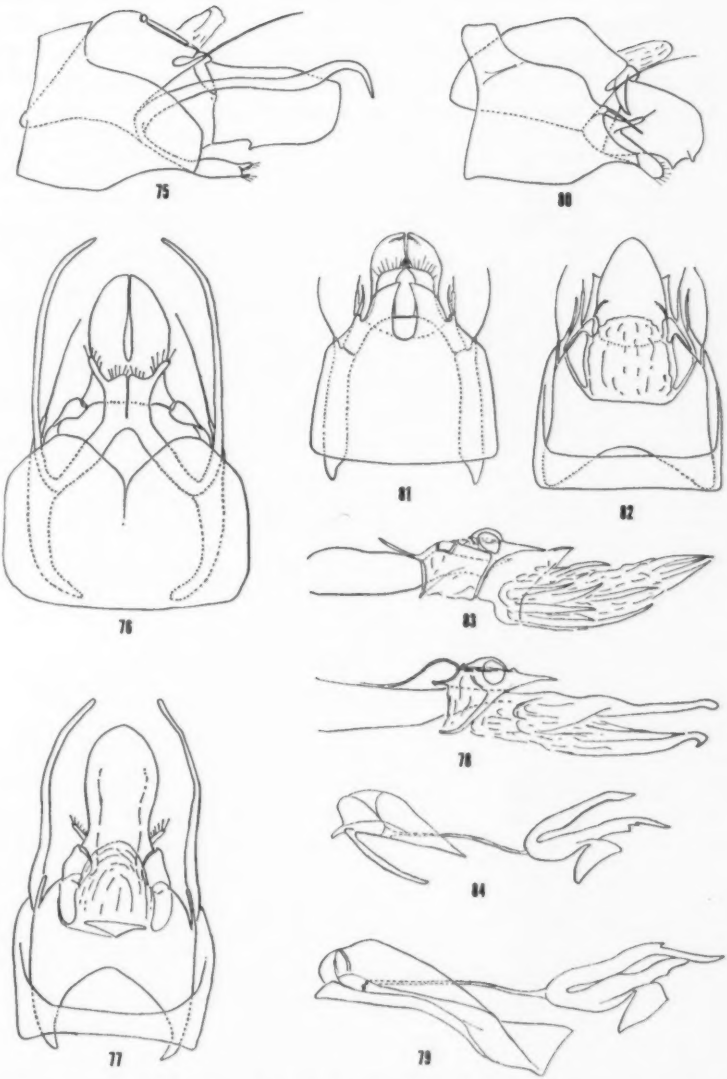
Color gray, mottled with grayish green; forewing of male unmodified. **Z. antilliensis**
Color, brown; forewing of male with a basal patch of modified setae. **Z. anomaloptera**

Zumatrichia antilliensis, new species

FIGURES 75–79, 86, 99–103

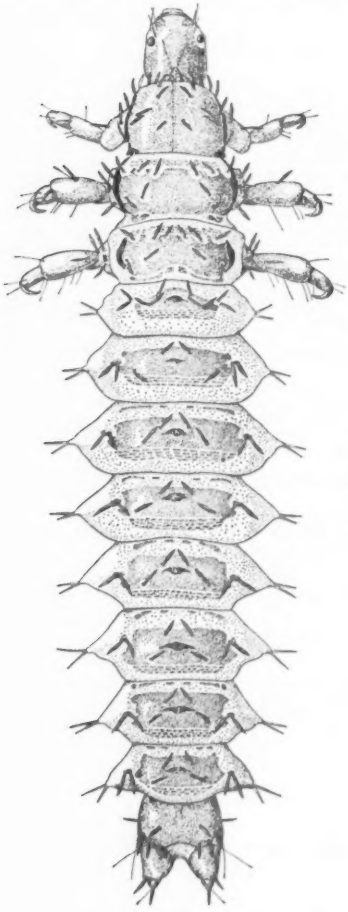
This species has been the most commonly encountered trichopteran on the island of Dominica, and it has also been taken on Guadeloupe, St. Lucia, and Grenada. It is related to *Z. galtena* Mosely from Mexico but is distinguished by the dorsal process of the clasper not being digitate apically and by the long hooked ventral process of the aedeagus.

ADULT.—Length of forewing 3 mm. Color intermingled patches of gray and gray green. Male genitalia: eight sternum with ventrolateral angles slightly produced; ninth segment with anterolateral angles produced as narrow lobes; cercus, rodlike, with a single long apical seta; clasper with a long basodorsal process, slightly sinuate apically; ventral portion with a slender apicolateral lobe; tenth tergum divided into platelike lateral lobes, rounded apically, with a midventral tooth; aedeagus with a middorsal process apically, a pair of lateral spines, and a pair of appressed, hooked, ventral processes; a complex



FIGURES 75–84.—*Zumatrichia antilliensis*, new species, male: 75, genitalia, lateral; 76, genitalia, ventral; 77, genitalia, dorsal; 78, aedeagus, lateral; 79, female, bursa copulatrix, lateral. *Z. anomaloptera*, new species, male: 80, genitalia, lateral; 81, genitalia, ventral; 82, genitalia, dorsal; 83, aedeagus, lateral; 84, female, bursa copulatrix, lateral.

at midlength and a basal loop. Female genitalia: eight and ninth segments weakly sclerotized, with short anterolateral rods; bursa copulatrix with basal group attached to apical group by a slender rod, apical group with long lateral supports.



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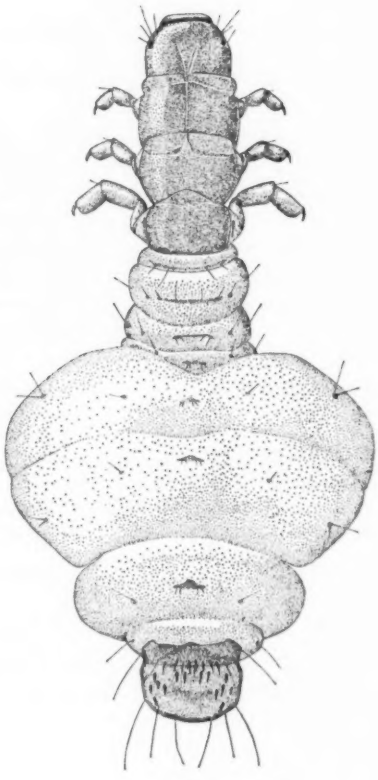

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FIGURES 85–86.—*Alisotrichia* species 2: 85, larva, dorsal. *Zumatrichia antilliensis*, new species: 86, larva, dorsal.

LARVA.—Length to 3 mm. Head, thorax slender, abdominal segments 5–7 greatly distended at maturity. Sclerites pale brown, marked with fuscus. Head unmodified. Legs short and broad; all airs very similar in structure. Meso- and metanota divided mesally.

Abdomen with tergites dorsally on segments 1–9, 1 small lateral sclerite on segments 2 and 8, 2 sclerites on segments 3–7. Anal proleg with basal segment terete, short; claw sharply decurved.

PUPA.—Length 3 mm. Mandible sickle shaped, broad, without serrations. Labrum membranous. Hook-plates anteriorly on segments 3–7, posteriorly on 3–5; each plate with many small teeth. Apex of abdomen with a membranous lobe containing genitalia.

CASE.—Length 3 mm, width 1½ mm. Silken, tightly attached to substrate. Larval case with round anterior and posterior openings. Pupa enclosed in an inner silken cocoon.

MATERIAL.—Holotype, male: Dominica, Clarke Hall, 17 April 1964, O. S. Flint, Jr., USNM type 69892. Allotype, female: same data. Paratypes (many thousands of specimens taken at the following localities, on many dates throughout the year, and by most collectors): Clarke Hall, Fond Figues, Layou Valley, Layou River Mouth, Grand Bay, Rosalie, Cabrit Swamp, Trafalgar, 2.5 and 3.5 miles north of Pont Casse, 1.6 miles west of Pont Casse, 1.3 and 2.2 miles east of Pont Casse. St. Lucia, Cul de Sac River at mile post 9, 29 July 1963, Flint and Cadet, 5♂; Vergallier River near Marquis, 2 Aug. 1963, Flint and Cadet, 2♂. Grenada, 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., many ♂♂♀♀; Balthazar, 7 Aug. 1963, O. S. Flint, Jr., 4♂. Guadeloupe, Petit-Bourg, Duclos, March 1966, J. Bonfils, many ♂♂♀♀. Other: Dominica, Fond Figues, 3 May 1964, O. S. Flint, Jr., larvae, ♂♀ metamorphotypes; Roseau River, 1 mile above Roseau, 23 July 1963, O. S. Flint, Jr., larvae and pupae; Layou River, 23–25 July 1963, O. S. Flint, Jr., larvae, ♂♀ metamorphotypes; Springfield, 20–26 July 1963, O. S. Flint, Jr., larvae, ♂♀ metamorphotypes; R. Laurent, Bells, 21 July 1963, O. S. Flint, Jr., larvae, ♂♀ metamorphotypes; Pont Casse, 3.5 miles north, 5 Dec. 1964, P. J. Spangler, larvae and pupae.

BIOLOGY.—This is the commonest species of Trichoptera on the island of Dominica. It is the only species that has successfully adapted to breeding in the large lowland rivers. The flat cases are attached in great abundance to the large boulders in the fast-flowing sections of these rivers. A few adults have also been taken near the small streams at high elevations; however, these may well have been carried up by winds from the lowlands.

The species seems less abundant on St. Lucia and Grenada. On the latter, *Z. antilliensis* seems to be replaced in the lowland rivers by *Z. anomaloptera*.

Zumatrichia anomaloptera, new species

FIGURES 80–84

On the basis of head, genitalia, and spurs, this species is a typical member of the genus *Zumatrichia;* however, it is the only species so far discovered that has the patch of modified setae present on the basal half of the forewing in the male.

ADULT.—Length of forewing 3 mm. Color brown; basal half of forewing of male with a large patch of deep brown, scalelike setae.

Male genitalia: eighth sternum bearing laterally from posterior margin an enlarged setae from a large base, and ventrally a pair of caliper-like lobes; ninth segment with anterolateral angle broad; cercus rod-like with a single long apical seta; clasper with a short, rodlike baso-dorsal process, ventral lobes rounded; tenth tergum divided into flat lateral plates, rounded apically, with a subapical ventral tooth; aedeagus with usual mesal and basal structures, apically with a large number of slender spines. Female genitalia: eighth and ninth segments with lateral rods; bursa copulatrix complex, basal group supported by a slender rod from apical group that has short lateral supports.

LARVA, PUPA, AND CASE.—Not different from *Z. antilliensis*.

MATERIAL.—Holotype, male: Grenada, Balthazar, 7 Aug. 1963, O. S. Flint, Jr., USNM Type 69893. Allotype, female: same data. Paratypes: same data, many ♂♂♀♀. St. Lucia, R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 1♂; Vergallier River, near Marquis, 21 July 1963, Flint and Cadet, many ♂♂♀♀; same, but 2 Aug. 1964, 2♂ 4♀. Dominica, Clarke Hall, 1–10 March 1965, W. W. Wirth, 1♂. Other: Grenada, Great River, at Balthazar, 8 Aug. 1963, O. S. Flint, Jr., larvae, ♂♂♀♀ metamorphotypes.

BIOLOGY.—The immature stages were found on large rocks in a large lowland river on Grenada. It thus seems that it has identical breeding habits to the preceding species, but that it has replaced *Z. antilliensis* in the lowlands of Grenada and St. Lucia.

Genus *Leucotrichia* Mosely

Leucotrichia Mosely, 1934, p. 157. [Type-species: *Leucotrichia melleopicta* Mosely, 1934, by original designation.]

This and the preceding genus are closely related, but *Leucotrichia* is found over most of North America as well as Central America. The male of *Leucotrichia* may be recognized by the unmodified antennae and presence of three ocelli.

The larvae are also similar in the two genera, but those of *Leucotrichia* lack the modified setae on the eighth and ninth terga. The immature stages are described in Ross (1944) and Flint (1964b), and so are not treated in detail here.

Leucotrichia sarita Ross

FIGURES 87–91

Leucotrichia sarita Ross, 1944, p. 274.

This species, described from Texas, is common in Mexico and Central America. There are some minute differences in the genitalia between the insular and mainland populations, but these are no greater than differences found on the mainland. The description is based on Grenadan examples.

ADULT.—Length of forewing 3 mm. General color fuscus, with bright green linear marks on forewings, tegulae, and head; antennae alternating black and white. Male genitalia: eighth sternum produced into an acute angle laterally, broadly U-shaped ventrally; ninth segment oblique, open anteroventrally, with a row of stout setae along posterior margin; claspers fused mesally, elongate, with a subapical seta dorsally, dorsally with a pointed mesal structure, partially enclosed by claspers that articulate basally with a linear lateral sclerite; tenth tergite strongly sclerotized, produced into a ventrolateral point; aedeagus with a pair of small apicolateral rods, a central dome with basolateral rods, and a basal loop. Female genitalia: eighth and ninth segments with anterolateral rods, posterior margin of eighth segment with a row of large setae; bursa copulatrix without an apical complex of supporting sclerites, but with a large complex basal group.

LARVA.—Unknown (from Grenada).

PUPA.—Length 2.5 mm. Mandibles sickle shaped, inner surface smooth. Hook-plates present anteriorly on segments 3–7, posteriorly on 3–5, each with many small hooks.

CASE.—Length 4 mm, width 2 mm. Silken, oval, domed, attached to substrate. Pupal case with a tight inner cocoon.

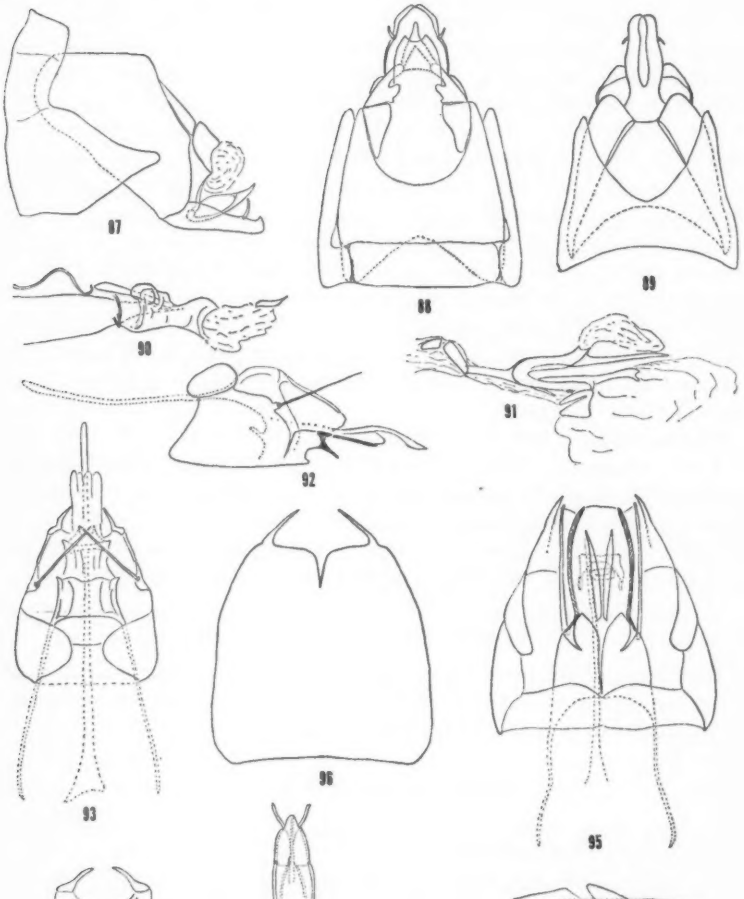
MATERIAL.—Grenada, Beausejour River, 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., many ♂ ♂ ♀ ♀, ♂ ♀ metamorphotypes.

BIOLOGY.—The pupae were taken on rocks in a cascade of a small mountain brook several feet wide by a few inches deep. The adults were attracted to a blacklight placed nearby.

Genus *Alisotrichia* Flint

Alisotrichia Flint, 1964b, p. 46. [Type-species: *Alisotrichia hirudopsis* Flint, 1964b, by original designation.]

Known from Puerto Rico and Jamaica previously, five species are assigned to the genus from Dominica. The typical males have enlarged basal antenal segments that cover the face, only two ocelli, and a spur count of 0, 2, 4. In addition to two species belonging to this typical group, I am assigning three species to this genus that belong to a rather different group. The males of this second group have unmodified antennal segments, three ocelli, and a spur count of 0, 3, 4. The thoracic structure is very similar in the two groups, however, and both have extremely modified genitalia. The female seventh tergum in this second group bears two straplike sclerites, rather than a single triangular one, but both have a simple ringlike bursa copulatrix. The larvae assumed to belong to this second group are very similar to the typical ones but also show several differences. Pending a total review



FIGURES 87–98.—*Leucotrichia sarita* Ross, male: 87, genitalia, lateral; 88, genitalia, dorsal; 89, genitalia, ventral; 90, aedeagus, lateral; 91, female, bursa copulatrix, lateral. *Alisotrichia orophila*, new species, male: 92, genitalia, lateral; 93, genitalia, dorsal; 94, eighth sternum, ventral. *A. lobata*, new species: 95, male genitalia, dorsal; 96, male eighth sternum, ventral; 97, male genitalia, lateral; 98, female genitalia, dorsal.

of this group, I prefer to leave both groups in the genus *Alisotrichia*, rather than establish a second genus.

Key to Species

LARVAE

1. Abdominal terga with large, elongate-oval setae . . . . . **A. species 2**
   Abdominal terga with short, truncate setae 2
2. First abdominal tergum with a central dark mark . . . . . **A. orophila**
   First abdominal tergum without a central mark . . . . . **A. species 1**

ADULTS

1. Midleg without a preapical spur 2
   Midleg with a preapical spur 3
2. Eighth sternum of male with a bifurcate ventrolateral lobe; forewing gray, with white patches . . . . . **A. orophila**
   Eighth sternum with a rounded dorsolateral lobe and a pointed ventrolateral lobe . . . . . **A. lobata**
3. Claspers fused into a single median rodlike process; forewings fuscus with bright green spots . . . . . **A. septempunctata**
   Claspers not fused; without green spots 4
4. With an elongate process extending ventrad from venter of tenth segment **A. dominicensis**
   Without an elongate midventral process from tenth sternum . . **A. wirthi**

Alisotrichia orophila, new species

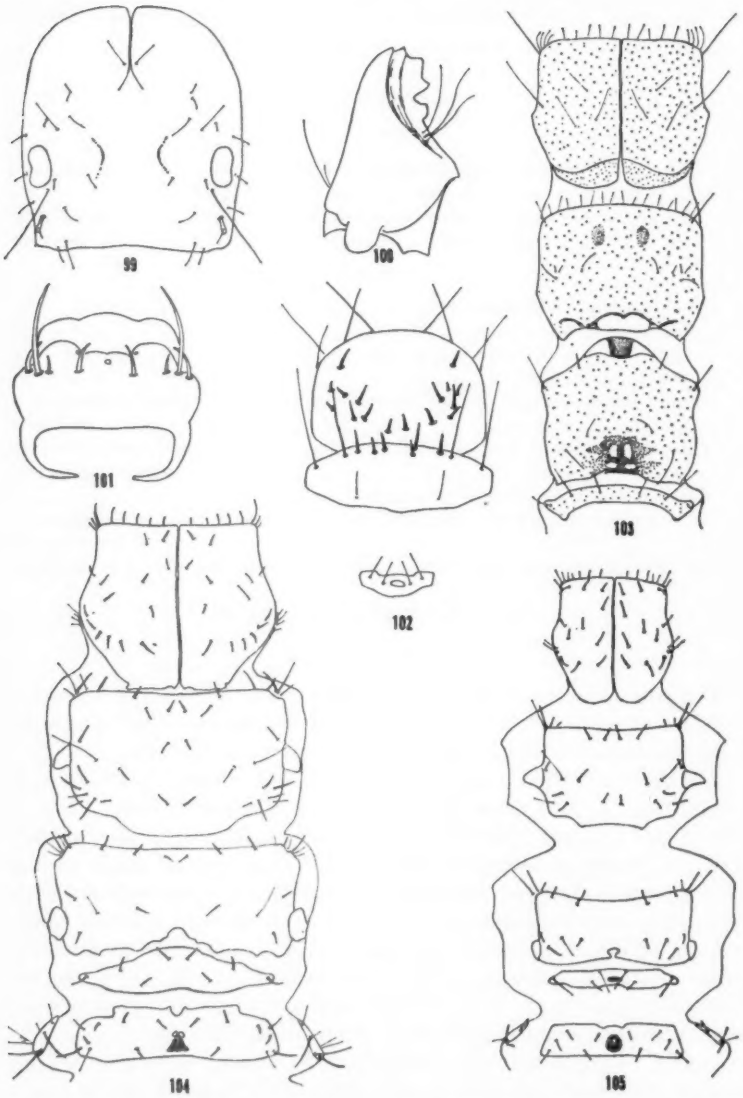
FIGURES 92-94, 105

The species seems to be closely related to the following from which it differs strikingly in the shape of the eighth sternum, which possesses a long dorsolateral spine and a bifurcate apicolateral hook.

ADULT.—Length of forewing 1.5 mm. Color grayish, forewing with alternating bands of silver and fuscus hair. Structure of head and appendages conforming closely to type species. Male genitalia: eighth sternum bearing a long dorsolateral spine, apicolateral angle with a strong mesally directed, shallowly bifurcate hook; ninth segment with extremely long anterolateral rods, with a dorsomesal sclerite; tenth tergum with paired dorsal, straplike sclerites, apex with a semimembranous process; aedeagus tubular, with conical base. Female genitalia: seventh tergum narrowly triangular; eighth and ninth segments with long anterolateral rods; apparently the same as following species.

LARVA.—Length 1.5 mm. Sclerites pale brown. Structurally very similar to larva of type species, but differing in the possession of a tergite on first abdominal segment.

PUPA.—Length 1.2 mm. Mandibles with a short apical blade, lacking mesal serrations. Hook-plates anteriorly on segments 3-7, posteriorly on 3-5; each with many hooks.



FIGURES 99–105.—*Zumatrichia antilliensis*, new species, larva: 99, head, anterior; 100, mandible, dorsal; 101, labrum, dorsal; 102, ninth, eighth, and seventh abdominal terga, dorsal; 103, thorax and first abdominal tergum, dorsal. *Alisotrichia* species 1: 104, larval thorax and first abdominal tergum, dorsal. *A. orophila*, new species: 105, larval thorax and first abdominal tergum, dorsal.

CASE.—Width 1 mm, length 2 mm. Oval, silken, appressed to substrate. Consisting of an outer flange attaching inner cocoon to rock.

MATERIAL.—Holotype, male: Dominica, D'leau Gommier, 15 Feb. 1965, W. W. Wirth, USNM type 69894. Allotype, female: Pont Casse, 2.5 miles east, 16 Jan. 1965, W. W. Wirth, stream margin. Paratype: Pont Casse, .4 miles east, 6 May 1964, O. S. Flint, Jr., 1 ♂. Other: D'leau Gommier, 27 April 1964, O. S. Flint, Jr., 1 larva, 2 pupae, 1 ♂ 1 ♀ metamorphotypes.

BIOLOGY.—The immatures of this species were collected on large stones kept wet by the cascade of a small mountain stream at the place where it emerged from the forest. The habitat is very similar to that of the type-species on Puerto Rico.

Alisotrichia lobata, new species

FIGURES 95–98

The males of this species are easily recognized by the large dorsolateral lobe of the eighth sternum and the long lateral process of the ninth segment.

ADULT.—Length of forewing 1.5 mm. Color grayish, forewing with alternating bands of silver and fuscus hairs. Corresponding closely to type-species in structure of head and appendages. Male genitalia: eighth tergum narrow, sternum greatly prolonged apicoventrally, with a large dorsolateral lobe, apicoventral angles produced into a sharp spine, midventrally with narrow incision; ninth segment with long, anterolateral, rodlike processes, divided dorsally on midline, with posterolateral swordlike processes; tenth tergum with paired, dorsal, straplike sclerites, with ventrolateral margin sclerotized, ventrally with a complex of sclerites; aedeagus tubular, with base slightly enlarged. Female genitalia: seventh tergum with a narrow, apicomesal, triangular sclerotization; eight and ninth segments with long anterolateral rods; tenth segment with long apical papillae.

LARVA, PUPA, AND CASE.—Not known for certain, but see following species.

MATERIAL.—Holotype, male: Dominica, Clarke Hall, malaise trap, 11–20 Jan. 1965, W. W. Wirth, USNM Type 69895. Allotype, female: Clarke Hall, cocoa trail, 18 Jan. 1965, W. W. Wirth. Paratypes: same data as allotype, 2 ♀; Fond Figues, 3 Feb. 1965, W. W. Wirth, 1 ♂.

BIOLOGY.—The few adults of this species have been taken in proximity to the larger lowland rivers.

Alisotrichia species 1

FIGURE 104

There is a single larva of a species closely related to *A. orophila* in the collections. The larva is a bit larger and the thoracic notae

and abdominal terga posses a few more setae than those of the larvae of *A. orophila*. The first abdominal tergum lacks the central dark mark, and the pores on the following segments are in front of the black mark rather than surrounded by it as in *A. orophila*.

The data with the specimen is: "Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr." Because this is a small high altitude stream rather than a lowland stream, I hesitate to definitely attribute this larva to *A. lobata*, to which it may well belong.

Alisotrichia dominicensis, new species

FIGURES 110–114

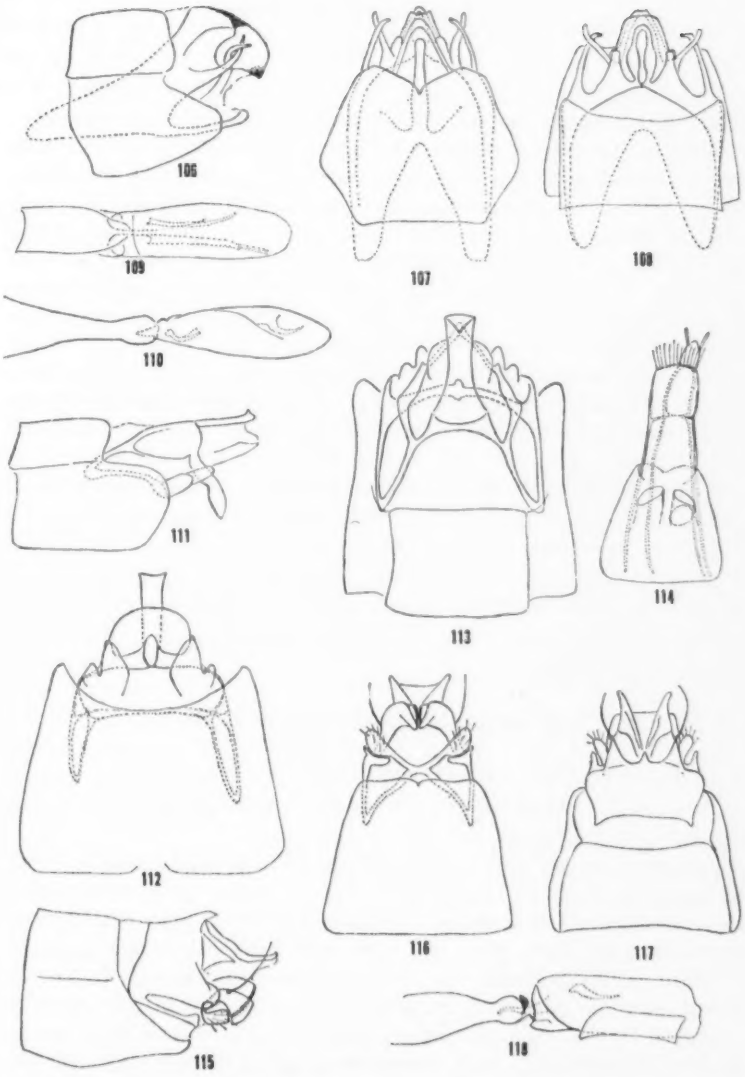
This species is easily recognized by the long ventral process and the middorsal sclerite of the tenth tergum and the bilobed claspers.

ADULT.—Length of forewing 2 mm. Color fuscus; antennae yellowish, face and mesonotum with white hairs, forewing with a white band at midlength and basally. Spurs, 0, 3, 4. Basal antennal segment not modified. Ocelli 3. Maxillary palpus with 2 basal segments minute, third, fourth, and fifth segments elongate, subequal. Male genitalia: seventh sternum with an apicomesal process; eighth tergum broad, posterior margin of sternum slightly produced laterally, almost squarely truncate lateroventrally; ninth segment produced anterolaterally, with margins heavily sclerotized; claspers arising ventrolaterally from ninth segment, bilobed, semimembranous; tenth tergum with a mesal straplike sclerite upturned apically on dorsum, ventrally with an elongate mesal structure extending directly ventrad; aedeagus mostly membranous, with basal and apical cylindrical portions separated by a constriction, apical portion with indistinct, short, internal spines. Female genitalia: sixth sternum with a small apicomesal point; seventh sternum with posterior margin slightly bilobed, tergum with a pair of straplike sclerotizations ending in an oval mark; eighth and ninth segments with long lateral rods, eighth with a row of setae along posterior margin; bursa copulatrix an internal sphere.

LARVA, PUPA, AND CASE.—Not known for certain, but see *Alisotrichia* species 2.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 2.2 miles east, 7 May 1964, O. S. Flint, Jr., USNM Type 69896. Allotype, female: Pont Casse, 2.5 miles east, 16 Jan. 1965, W. W. Wirth. Paratypes: same data as holotype, but 3 May 1964, 1 ♀; same data as allotype, 2 ♀; Fond Figues, 25 Jan. 1965, W. W. Wirth, 2 ♂; Morne Nicholls, 9 Nov. 1964, P. J. Spangler, 1 ♀.

BIOLOGY.—The adults were taken near either a small cascading mountain brook or a larger lowland river also with some cascades.



FIGURES 106–118.—*Alisotrichia septempunctata*, new species, male: 106, genitalia, lateral; 107, genitalia, ventral; 108, genitalia, dorsal; 109, aedeagus, dorsal. *A. dominicensis*, new species: 110, aedeagus, lateral; 111, male genitalia, lateral; 112, male genitalia, ventral; 113, male genitalia, dorsal; 114, female genitalia, dorsal. *A. wirthi*, new species, male: 115, genitalia, lateral; 116, genitalia, ventral; 117, genitalia, dorsal; 118, aedeagus, lateral.

Alisotrichia wirthi, new species

FIGURES 115–118

This species is closely related to the preceding, from which it is easily separated by the very different claspers and tenth tergum.

ADULT.—Length of forewing 2.5 mm. Color in alcohol uniformly fuscus. Basal antennal segments unmodified. Ocelli 3. Maxillary palpus with 2 basal segments very short, apical segments long, each slightly longer than preceding. Spurs 0, 3, 4. Abdominal sterna lacking processes. Male genitalia: eighth tergum broad, sternum produced ventrally, truncate in ventral aspect; ninth segment quadrate, with a middorsal point, a small lateral flap, and a ventral rodlike support; claspers with a ventrolateral lobe, and a flattened mesal lobe bearing a stout setae from its dorsal margin; tenth tergum consisting of paired elongate dorsal sclerites, a triangular lateral sclerite, and flattened ventromesal sclerites lying within the mesal lobes of the claspers; aedeagus with cylindrical basal and apical portions separated by a constriction, apical portion with an indistinct internal spine, with outer surface sclerotized in basoventral region.

LARVA, PUPA, AND CASE.—Not known.

MATERIAL.—Holotype, male: Dominica, Fond Figues, 13 March 1965, W. W. Wirth, USNM Type 69897. Paratype: same, but 6 April 1964, O. S. Flint, Jr., 1 ♂.

BIOLOGY.—Both specimens were taken at light near a large, clear, fast-flowing lowland river.

Alisotrichia septempunctata, new species

FIGURES 106–109

Both the coloration of this species and the unique structure of the genitalia are diagnostic.

ADULT.—Length of forewing 2.5 mm. Black, each forewing with 3 bright green spots, mesonotum with a green mesal spot. Basal antennal segment unmodified. Ocelli 3. Maxillary palpus with 2 basal segments very short, third and fifth long, subequal, fourth ⅔ length of third. Male genitalia: no processes from sterna; eighth tergum broad, sternum produced ventrolaterally, posterior margin broadly V-shaped in ventral aspect; ninth segment with ventrolateral angles prolonged anteriorly, with posterior margin produced into an upturned, swordlike process; claspers completely fused, developed as a long, slender rodlike process from apex of ninth sternum; a terete, semimembranous process arising mesad of lateral process of ninth segment; tenth tergum flattened, developed as broad lateral plates with an apicoventral point, dorsally with a pair of mesal parenthesis-like sclerites; aedeagus with apical and basal cylindrical portions

separated by a constriction, apical portion with several pairs of elongate internal spines.

LARVA, PUPA, AND CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 2.2 miles east, 14 April 1964, O. S. Flint, Jr., USNM Type 69898.

BIOLOGY.—The only known specimen was taken at a black light at a small tumbling brook.

Alisotrichia species 2

FIGURE 85

I am here describing the larvae of a species that is clearly related to *Alisotrichia* although they do possess a number of unique characteristics. The possession of numerous small intercalary sclerites on the thorax and abdomen, and the large, elongate-oval setae are very distinctive.

It seems quite probable that these are the larvae of one of the last three species.

LARVA.—Length 3.5 mm. Sclerites brown. Slightly flattened, abdomen gradually tapering toward posterior. Structurally much like the larva of type-species, differing as follows. Thoracic notae and abdominal tergites bearing long, broad, pointed, black setae; propleuron with 1, meso- and metapleura with 2 of these setae. Meso- and metanota anteriorly and abdominal terga posteriorly with a broad border of sclerotized spots. Small intercalary sclerites present between segments from the mesonotum to the eighth segment. Abdomen with 9 tergites; that of first segment barely different from those of segments beyond.

MATERIAL.—Dominica, R. Laurent, 21 July 1963, O. S. Flint, Jr., 1 larva. Geneva Estate, 9 Dec. 1964, P. J. Spangler, 1 larva. Fond Figues R., 9 Feb. 1965, W. W. Wirth, 1 larva.

BIOLOGY.—The larvae were collected from boulders in rocky sections of swiftly flowing lowland rivers.

Genus *Neotrichia* Morton

Neotrichia Morton, 1905, p. 72. [Type-species: *Neotrichia collata* Morton, 1905, by monotypy.]

The genus contains numerous species, all of New World distribution. The species are all very small, generally being less than two millimeters long.

The larvae were described by Flint (1964b) and Ross (1944). They construct small, cylindrical cases made of very small sand grains.

Key to Species

ADULT

Male genitalia with subgenital plate elongate, directed posteriad; female eighth sternum with a large heart-shaped midventral lobe . . . . . **N. iridescens**

Male subgenital plate with apex slender, angled sharply ventrad; female eighth sternum without midventral lobe . . . . . **N. corniculans**

Neotrichia iridescens Flint

FIGURES 119–123

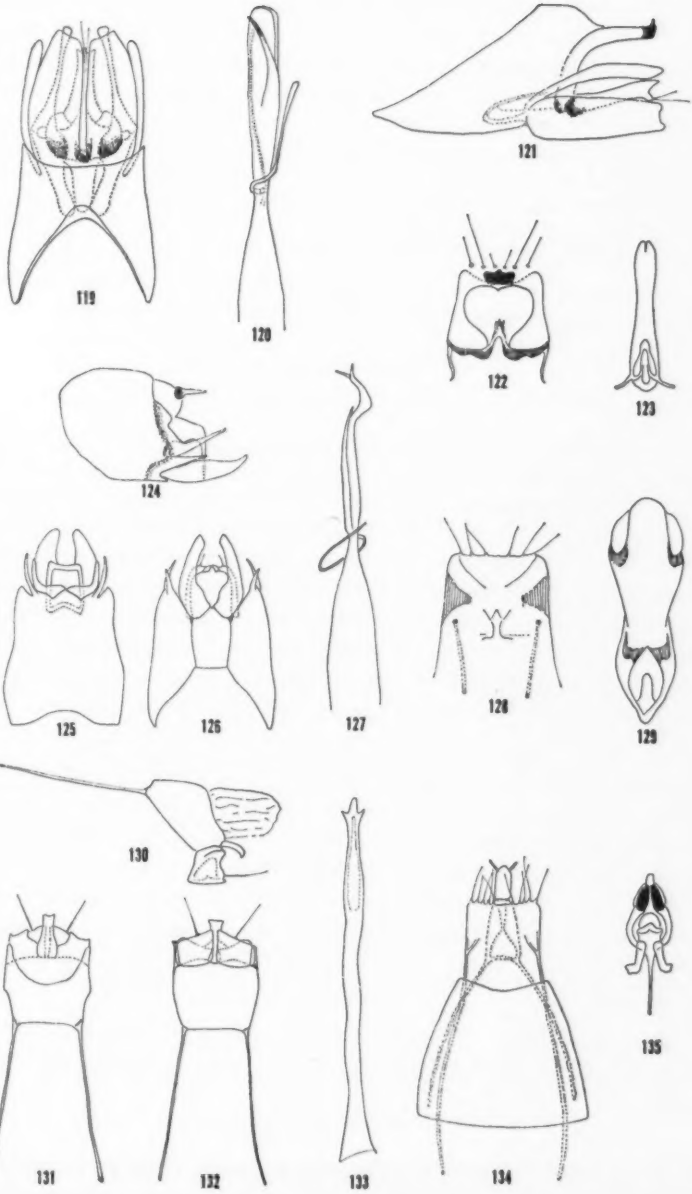
Neotrichia iridescens Flint, 1964b, p. 51; 1968a, p. 37.

Originally described from Puerto Rico, this species has since been recorded from Jamaica and is now recorded from Dominica and St. Lucia.

The Dominican examples agree closely with the type except that the darker ventral processes of the subgenital plate are nearer its apex. The St. Lucian specimens seem to have a narrower and more twisted apex of the aedeagus and the dorsolateral process of the ninth segment has both dorsal and ventral points apically.

ADULT.—Length of forewing 1.5–2 mm. Color mottled grayish brown; forewing of female with a patch of purplish iridescent scales centrally. Male genitalia: ninth segment produced basoventrally, posterior margin with a dorsolateral process whose tip is developed into a dorsal (and sometimes ventral) point; clasper elongate and rectangular in lateral view, in ventral view with apex obliquely truncate; bracteole slender, arising near base of clasper; subgenital plate elongate, slender, with dark, ventrally directed lobes at midlength; aedeagus with a membranous process arising near midlength, and a more strongly sclerotized process near apex, central tube trough shaped apically. Female genitalia: eighth sternum with anterior margin heavily sclerotized, with a pair of short anterolateral rods, mesally with a heart-shaped lobe, and posteriorly with a rectangular sclerite, posterior margin with 3 pairs of setae; bursa copulatrix elongated apically, basolateral angles rodlike, with a basomesal complex.

FIGURES 119–135.—*Neotrichia iridescens* Flint: 119, male genitalia, ventral; 120, aedeagus, dorsal; 121, male genitalia, lateral; 122, female eighth sternum, ventral; 123, bursa copulatrix, ventral. *N. corniculans* new species: 124, male genitalia, lateral; 125, male genitalia, dorsal; 126, male genitalia, ventral; 127, aedeagus, dorsal; 128, female eighth sternum, ventral; 129, bursa copulatrix, ventral. *Bredinia dominicensis*, new species: 130, male genitalia, lateral; 131, male genitalia, dorsal; 132, male genitalia, ventral; 133, aedeagus, dorsal; 134, female genitalia, ventral; 135, bursa copulatrix, ventral.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LARVA.—Length to 2 mm. Nearly cylindrical in outline. Sclerites pale yellowish. Head with a spinelike process behind eyes. Apical abdominal segments with many long, dark setae; anal prolegs elongate.

CASE.—Nearly cylindrical, posterior slightly flattened and tapered. Made of very small sand grains.

MATERIAL.—Dominica, Clarke Hall, 11–20 Jan. 1965, W. W. Wirth, 1♂; same, but 21–29 April 1964, O. S. Flint, Jr., 1♂ 1♀; Pont Casse, .4 miles east, 25 June 1964, O. S. Flint, Jr., 1 pupa; Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., 2 cases. St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 6♂ 3♀, 3 larvae, 2 pupae.

BIOLOGY.—The immature stages are found on rocks in the more slowly flowing sections of both the larger and small rivers.

Neotrichia corniculans, new species

FIGURES 124–129

This species appears to be related to the group of species named *Dolotrichia* by Mosely. From all known species it is easily recognized by the hornlike shape of the tenth tergite and the shape of the claspers.

ADULT.—Length of forewing 1.5 mm. Color silvery gray. Male genitalia: ninth segment rounded anteriorly, posterior margin developed into a thin lateral shelf that bears two pointed processes, dorsal one longest; tenth tergum developed as a pair of curving hornlike processes directed first laterad then posteriad; subgenital plate long, attenuate, and angled sharply ventrad; clasper elongate, slightly narrowed apically; aedeagus with apical half divided into two processes, longer one twisted apically and with a bifid tip, a whiplike process arising at midlength. Female genitalia: eighth sternum with a dark lateral mark and a small raised central structure shaped like an arrowhead; bursa copulatrix elongate with a basal opening and two pairs of lateral pouchlike invaginations.

LARVA, PUPA, AND CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, D'leau Gommier, 16 March 1965, W.W. Wirth, USNM Type 69899. Allotype, female: same data. Paratypes: same data, 1♀; same, but 15 Feb. 1965, 3♂ 3♀; Pont Casse, 1.0 mile east, 29 Jan. 1965, W.W. Wirth, 1♀.

BIOLOGY.—Little is known of the biology of this species. The adults have been taken only at higher elevations on the island.

Bredinia, new genus

Three ocelli. Spurs 0, 2, 4. Mesoscutellum divided by a transverse suture, with a broad sclerite along posterior margin. Metascutellum

as wide as scutum, short and rectangular. Wings narrow, evenly acuminate.

Type-species: *Bredinia dominicensis*, new species.

The relationship of the genus is rather obscure. It would seem to be most closely related to *Neotrichia* as is shown by the presence of ocelli, minute size, and wing shape. The spur count is the same as is found in *Mayatrichia*, a genus closely related to *Neotrichia;* however, the structure of the thoracic notae (almost exactly as shown in Ross, 1944, fig. 438) is totally different from *Neotrichia* or *Mayatrichia* in which the mesoscutellum is entire and the metascutellum trianguloid. It may well be that the genus is related to *Alisotrichia* as is suggested by the structure of the thorax and dorsolateral rods of the male ninth segment. The discovery of the larval stages will be necessary to settle the exact relationship of the genus.

It is with great pleasure that I name this genus for Mr. J. Bruce Bredin.

Bredinia dominicensis, new species

FIGURES 130–135

Since this is the only known species in the genus, it is not possible to point out specific characters.

ADULT.—Length of forewing 1.5 mm. Color silvery gray, forewing with bands of white hair apically and basally. Male genitalia: eighth sternum divided midventrally; ninth segment narrow, oblique, lateral halves divided ventrally by the claspers, anterior margin with long, slender supports dorsolaterally; tenth tergum a large membranous lobe; clasper rather quadrate, with narrow dorsal and ventral ridges, a long seta from ventral ridge; subgenital plate elongate, rectangular, slightly widened apically; aedeagus tubular, apex flattened, tridentate, with a central tubule in apical fourth. Female genitalia: seventh segment with apical margin squarely truncate; eighth segment simple, with anterolateral rods, and a row of setae along posterior margin; ninth segment elongate with anterolateral rods; tenth segment trianguloid, with apical papillae; bursa copulatrix with a long basomesal process and a pair of basolateral tubules, a central complex, apically with a pair of dark oval sclerites.

LARVA, PUPA, AND CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Hodges River mouth, swamp forest, 27 Feb. 1965, W. W. Wirth, USNM Type 69900. Allotype, female: same data. Paratypes: same data, 1♂; Fond Figues, 3 Feb. 1965, W. W. Wirth, 1♂; same, but 13 March 1965, 2♀.

BIOLOGY.—The adults have been taken only near the larger lowland rivers.

Genus *Oxyethira* Eaton

Oxyethira Eaton, 1873, p. 143. [Type-species: *Hydroptila costalis* Curtis, 1834, by original designation.]

Oxyethira is a genus of worldwide distribution, containing numerous species in most regions. Each of the Antillean islands support several species.

The immature stages and the cases they make are very similar throughout the genus. Nielsen (1948) has given an excellent account of the morphology and biology of the immature stages of the type-species.

Key to Species

ADULTS

1. With aedeagus, etc.: males 2
   Without aedeagus: females 5
2. Ninth sternum elongate, scooplike, apex bifid 3
   Ninth sternum not elongated 4
3. Ninth sternum deeply and widely divided apically. . . . . **O. azteca**
   Ninth sternum with a short, narrow apical division . . . . . **O. janella**
4. Eighth segment dorsally with a sabre-like process, with a broad lateral flap. **O. cirrifera**
   Eighth segment with a pair of short, flattened dorsal lobes, and erect dorsolateral lobe . . . . . **O. tega**
5. Bursa copulatrix with paired, long, rodlike, anterior and posterior supports. **O. janella**
   Bursa without rodlike supports 6
6. Eighth sternum with sclerotized apicolateral invaginations . . **O. cirrifera**
   Eighth sternum without invaginations 7
7. Bursa rounded basally, shield shaped, with earlike apical lobes . . **O. tega**
   Bursa angulate basolaterally and mesally, apical lobes not earlike. **O. azteca**

Oxyethira janella Denning

FIGURES 136–137, 148

Oxyethira janella Denning, 1948, p. 397.—Flint, 1968a, p. 42.
Oxyethira neglecta Flint, 1964b, p. 57; 1968a, p. 42.

This species appears to be the most widespread Antillean caddisfly. It has been found on Jamaica, Puerto Rico, Dominica, St. Lucia,

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FIGURES 136–149.—*Oxyethira janella* Denning, male genitalia: 136, lateral; 137, dorsal. *O. azteca* Mosely, male genitalia: 138, lateral; 139, dorsal. *O. cirrifera* Flint, male genitalia: 140, lateral; 141, ventral. *O. tega* Flint, male genitalia: 142, lateral; 143, ventral. *O. cirrifera* Flint: 144, aedeagus, lateral. *O. tega* Flint: 145, aedeagus, dorsal; 146, female genitalia, ventral. *O. cirrifera* Flint: 147, female genitalia, ventral. *O. janella* Denning: 148, female genitalia, ventral. *O. azteca* Mosely: 149, female genitalia, ventral.

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Grenada, in Florida, and in Central America. It is closely related to *O. puertoricensis* Flint and *O. azteca* Mosely. From both it differs in the male sex in the long narrow ninth sternum.

ADULT.—Length of forewing 2–3 mm. Color various shades of brown and white. Seventh sternum with a small spine posteromesally. Male genitalia: eighth segment surrounding most of genital capsule, divided ventromesally, with dorsolateral lobe surpassing ventrolateral lobe; ventral part of ninth segment narrow, scooplike much surpassing eighth segment, dorsal structure Y-shaped; aedeagus a single spinelike structure resting in fork of the Y. Female genitalia: eighth sternum with posterior margin bilobate; bursa copulatrix with anterior processes twice length of bursa.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Dominica, Clarke Hall, 11–20 Jan. 1965, W. W. Wirth, 2♂ 3♀; same, but 21–30 Jan. 1965, 1♂ 4♀; same, but 27 Jan. 1965, J. F. G. Clarke, 2♀; same, but 1–10 Feb. 1965, W. W. Wirth, 1♀; same, but 11–20 Feb. 1965, 2♂ 13♀; same, but 18 Feb. 1964, D. F. Bray, 1♀; same, but 21–28 Feb. 1965, W. W. Wirth, 2♀; same, but 25 Feb. 1964, D. F. Bray, 4♀; same, but 1–10 March 1965, W. W. Wirth, 6♀; same, but 11–20 March 1965, 3♀; same, but 21–30 March 1965, 3♀; same, but 10–20 April 1964, O. S. Flint, Jr., 12♀; same, but 21–29 April 1964, 7♂ 61♀; same, but 1–10 May 1964, 1♂ 1♀; same, but 11–20 May 1964, 3♂ 19♀; same, but 1–15 June 1964, 11♀; same, but 15–30 June 1964, 11♂ 106♀; Layou Valley, 23–25 July 1963, O. S. Flint, Jr., 1♀; Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 5♀; Fond Figues, 13 March 1965, W. W. Wirth, 2♂ 32♀; same, but 6 April 1964, O. S. Flint, Jr., 1♂; same, but 7 May 1964, 1♂ 2♀; Grand Bay, 13 March 1964, D. F. Bray, 1♀; same, but 13 April 1964, O. S. Flint, Jr., 3♀; Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., 1♀; same, but 28 April 1964, 1♀; same, but 19 May 1964, 1♂ 4♀; same, but 16 June 1964, 2♂ 4♀; Pont Casse, 3.5 miles north, 5 Dec. 1964, P. J. Spangler, 3♀; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 1♀; same, but 12 May 1964, 1♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 4♀; same, but 19 June 1964, 10♀; Pont Casse, 3 miles east, 13–16 Oct. 1966, A. B. Gurney, 1♂ 3♀; Pont Casse, .4 mile east, 6 May 1964, O. S. Flint, Jr., 2♀; Sylvania, 23 Jan. 1965, W. W. Wirth, 7♂ 14♀. St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 1♀; Cul de Sac River, at mile post 9, 27 July 1963, Flint and Cadet, 5♀. Grenada, 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., 7♂ 9♀.

BIOLOGY.—Although the immature stages of this species have not been taken, they will probably be found in most flowing water habitats. Adults have been attracted to lights at most elevations on many of the islands.

Oxyethira azteca (Mosely)

FIGURES 138–139, 149

Lozotrichia azteca Mosely, 1937, p. 165.
Oxyethira azteca (Mosely).—Ross, 1944, p. 295.

This species described from Mexico, where it is quite common, will undoubtedly be found to be widely distributed in Central and northern South America. It is here recorded from Grenada for the first time.

The species is related to *O. janella* but is easily recognized by the more deeply divided ninth sternum and the very different dorsal processes of the same segment.

ADULT.—Length of forewing 2 mm. Color various shades of brown and white. Male genitalia: eighth segment divided midventrally and dorsally, posterolateral margin bilobate; ninth sternum produced posteriorly, deeply divided apically, dorsally giving rise to a pair of curving rods laterad to the aedeagus, each with an apical spine, ventrad to aedeagus a mesal, pointed structure; aedeagus tubular, basally expanded. Female genitalia: eighth sternum with posterior margin slightly bilobate, with a pair of ovate depressions; bursa copulatrix with posteriolateral supports, with basal portion angulate, complex, with a large basal membranous sac.

LARVA, PUPA, CASE.—Not known for certain.

MATERIAL.—Grenada, 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., 24 ♂ 11 ♀. Balthazar, 7 Aug. 1963, O. S. Flint, Jr., 1 ♂ 2 ♀.

BIOLOGY.—A number of typical larvae and pupae of this genus were taken on rocks in the small brook two miles west of Grand Etang and may belong to either this or the preceding species. The stream is about three feet wide by six inches deep on the average, clear, and tumbling over bedrock and boulders.

Oxyethira cirrifera Flint

FIGURES 140–141, 144, 147

Oxyethira cirrifera Flint, 1964b, p. 57; 1968a, p. 42.

The species was described from Puerto Rico and has since been found on Jamaica, and now Dominica. It is related to the following species, from which it differs most noticeably in the structure of the eighth segment and aedeagus.

ADULT.—Length of forewing 2 mm. Color pale brown with some darker flecks. Male genitalia: eighth tergum produced laterally into a long saber-like process, sternum produced dorsolaterally in a broad flap; clasper dark, tightly attached to ninth sternum, quadrate in ventral aspect; subgenital plate C-shaped in lateral aspect, in ventral aspect produced into 2 submesal points; an elongate, seta-bearing rod dorsal of clasper; aedeagus with a flattened process arising at midlength and twisted around central tube 1¼ times; central tube attenuate beyond origin of process, tip slightly twisted. Female genitalia: eighth sternum produced as a semicircular flap mesally, apicolaterally with sclerotized, pouchlike invaginations; bursa copulatrix short with a pair of jawlike apical processes.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Dominica, Cabrit Swamp, 23 Feb. 1965, W. W. Wirth, 12 ♀; same, but 18 June 1964, O. S. Flint, Jr., 2 ♂ 2 ♀.

BIOLOGY.—The species has been taken on the island of Dominica only near a large lowland swamp with slowly flowing streams. It has been found, however, near fast waters on other islands.

Oxyethira tega Flint

FIGURES 142–143, 145–146

Oxyethira tega Flint, 1968a, p. 44.

This species recently described from Jamaica is here recorded from Dominica. The species is easily distinguished from the preceding by the shape of the eighth segment, claspers, and aedeagus.

ADULT.—Length of forewing 2–2.5 mm. Color pale brown, with darker flecks. Male genitalia: eighth segment with a pair of flat dorsomesal lobes, and an erect dorsolateral lobe; anterior margin of ninth segment developed into a rounded lobe; claspers forming a ribbon-like band along ventral margin of ninth segment; subgenital plate developed into a triangular plate beneath aedeagus in ventral aspect, with lateral processes surrounding aedeagus, and developed into dorsal points; two pairs of membranous rods above clasper; aedeagus with apical half divided into 2 processes, 1 of which bears an internal tubule. Female genitalia: eighth sternum slightly bilobate; ninth sternum sclerotized laterally; bursa copulatrix shield shaped with a central opening, and a pair of apicolateral earlike flaps.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Dominica, Freshwater Lake, 21 Jan. 1965, W. W. Wirth, 1♂; same, but 22 Feb. 1964, D. F. Bray, 5♂ 7♀; Sylvania, 23 Jan. 1965, W. W. Wirth, 3♂ 3♀; Clarke Hall, 21–31 Jan. 1965, W. W. Wirth, 1♂; same, but 1–10 Feb. 1965, 1♀; same, but 11–20 Feb. 1965, 2♂ 4♀; same, but 21–28 Feb. 1965, 1♂; same, but 1–10 March 1965, 1♂; same, but 21–31 March 1965, 2♂ 1♀; same, but 21–29 April 1964, O. S. Flint, Jr., 1♀; same, but 15–30 June 1964, 4♂ 4♀; Mannett Gutter, 10 March 1965, W. W. Wirth, 1♀; Grand Bay, 13 April 1964, O. S. Flint, Jr., 1♂; Fond Figures, 13 March 1965, W. W. Wirth, 3♂ 2♀.

BIOLOGY.—The adults have been taken at light both near the larger lowland rivers, and a highland lake.

Genus *Hydroptila* Dalman

Hydroptila Dalman, 1819, p. 125. [Type-species: *Hydroptila tineoides* Dalman, 1819, by monotypy.]

The genus *Hydroptila* has been found in all the faunal realms of the world. One or two species have been encountered on each of the Antillean islands that have been collected in depth.

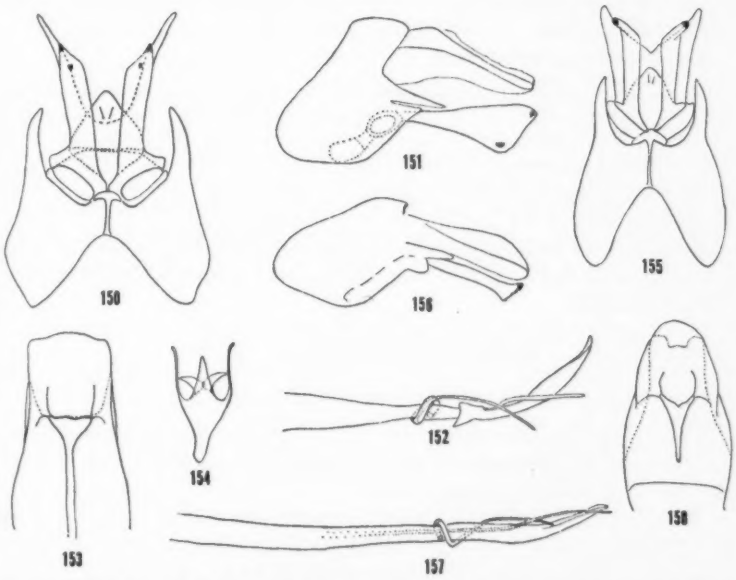
The immature stages have been described in detail by Nielsen (1948). They inhabit in the final instar a "purse-case" made of silk, often incorporating sand and plant matter.

Key to Species

ADULTS

Clasper of male in lateral aspect very narrow, developed into an apicodorsal point; eighth tergum of female slightly less produced than sternum, trilobate. **H. grenadensis**

Clasper broader, widening regularly from base to apex; eighth tergum deeply and rectangularly emarginate . . . . . **H. antilliarum**



FIGURES 150–158.—*Hydroptila antilliarum*, new species: 150, male genitalia, ventral; 151, male genitalia, lateral; 152, aedeagus, lateral; 153, female eighth sternum, ventral; 154, bursa copulatrix, ventral. *H. grenadensis*, new species: 155, male genitalia, ventral; 156, male genitalia, lateral; 157, aedeagus, lateral; 158, female eighth sternum, ventral.

Hydroptila antilliarum, new species

FIGURES 150–154

This species is related to a species from Mexico that I believe to be *H. paschia* Mosely. From this species it differs in the more deeply divided tenth tergum, longer claspers, and smaller membranous process of the aedeagus.

ADULT.—Length of forewing 2 mm. Color brown, mottled with patches of white hair. Male genitalia: ninth segment with anterior margin slightly expanded ventrally, posterior margin developed into a sharp point laterad of clasper; tenth tergum with declivent, sclerotized, lateral band, divided dorsally almost to base; clasper evenly

expanded toward apex in lateral view, with two dark lateral points, in ventral view almost parallel sided; aedeagus with a flattened, heavily sclerotized, apical portion, giving rise subbasally to a membranous process, twisted process wrapped around apical section 1½ times, shorter than apical section. Female genitalia: eighth sternum elongate apically, dorsal margin deeply and rectangularly emarginate, midventral mark goblet shaped, with a long stem; bursa copulatrix with lyre-shaped apicolateral arms, a starlike central complex and a short basal stem.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.6 miles west, 27 June 1964, O. S. Flint, Jr., USNM type 69901. Allotype, female: Clarke Hall, 11–20 Feb. 1965, W. W. Wirth. Paratypes: same data as allotype, 1♀; same, but 21–31 March 1965, 1♀; same, but 11–20 May 1964, O. S. Flint, Jr., 1♀; same, but 15–30 June 1964, 1♀; Fond Figues, 7 May 1964, O. S. Flint, Jr., 1♀. Other: St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 1♀.

BIOLOGY.—The adults have been taken at light primarily in the lowlands, but the holotype was taken near a slowly flowing, small highland stream.

Hydroptila grenadensis, new species

FIGURES 155–158

This species is quite closely related to the preceding although there is considerable difference in the shape of the clasper, which is very narrow with an apicodorsal point.

ADULT.—Length of forewing 2 mm. Color pale brown, forewing mottled with brown and white. Male genitalia: ninth segment rounded anteriorly, with a sharp spine from posterior margin laterad of clasper; tenth tergum sclerotized laterally, with dorsum divided mesally about a third of its length; clasper narrow, apex developed into a distinct dorsolateral point bearing a black spot; aedeagus flattened apically with a membranous process exiting from near its base, twisted process wrapped around stem 1⅓ times, shorter than apical portion. Female genitalia: eighth segment with posteroventral margin evenly rounded, dorsal margin shallowly emarginate, trilobate, ventral surface with a goblet-shaped mark; bursa copulatrix identical to that of preceding.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Grenada, 2 miles west of Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., USNM Type 69902. Allotype, female: same data. Paratypes: same data, 3♂ 4♀; Bathazar, 7 Aug. 1964, O. S. Flint, Jr., 15♀.

BIOLOGY.—The adults have been taken near both a large, rapid lowland river and a small, tumbling mountain brook.

Genus *Ochrotrichia* Moesly

Ochrotrichia Mosely, 1934, p. 162. [Type-species: *Ochrotrichia insularis* Mosely, 1934, by original designation.]

The genus, which is of exclusively New World distribution, is divided into two subgenera, *Metrichia* and *Ochrotrichia*. The adults of the former are easily recognized by the presence of an apical spur on the foreleg.

The mature larvae inhabit compressed, purse-shaped cases, similar in appearance to those of *Hydroptila*. To date no characteristics have been found that will serve to separate the larvae of the two subgenera. The larvae of *Metrichia* were described by Flint (1964b); and *Ochrotrichia*, by Ross (1944).

Key to Species

ADULTS

1. With claspers and aedeagus: males 2
   Without claspers and aedeagus: females 7
2. Foretibia without apical spur 3
   Foretibia with apical spur 5
3. Clasper short with posterior margin developed into many spurs. **O. spinosissima**
   Clasper elongate, not developed into spurs 4
4. Clasper elongate, paralled sided, produced into an apicodorsal lobe . **O. brayi**
   Clasper shorter, higher, hind margin bilobate . . . . . **O. ponta**
5. Abdominal segments 4 and 5 with hair tufts and internal sacs. **O. exclamationis**
   These segments unmodified 6
6. Apicodorsal lobe of clasper narrowed and developed into a spur. . **O. campana**
   Apicodorsal lobe pointed, but not spurlike . . . . . **O. similis**
7. Without apical spur on foretibia 8
   With apical spur on foretibia 9
8. Eighth sternum with a tongue-like process posteriorly . . . **O. spinosissima**
   Eighth sternum with a small mesal lobe . . . . . **O. ponta**
9. Eighth sternum with a large internal sclerite . . . . . **O. species 2**
   Eighth sternum with a posterior collar, but no internal plate . . **O. species 1**

Ochrotrichia (*O.*) *spinosissima* Flint

FIGURES 159–163

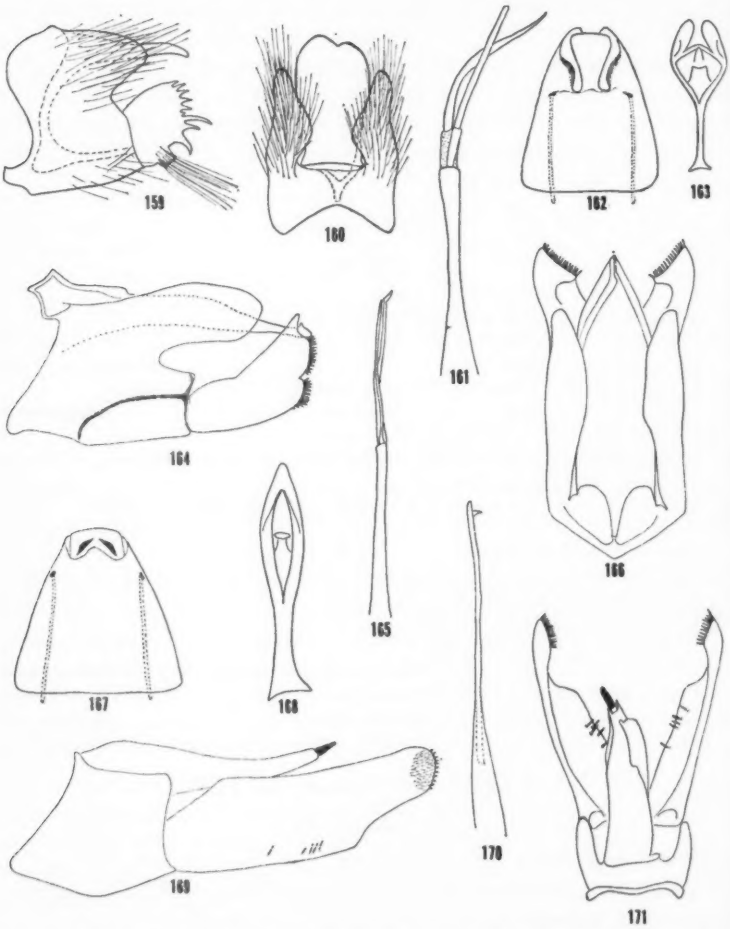
Ochrotrichia spinosissima Flint, 1964b, p. 58.

The species was described from Puerto Rico. The shape of the clasper and aedeagus is distinctive.

The female is ascribed to this species primarily on coloration, which is quite different in *O. brayi*, the only other species of the subgenus in which the female is unknown.

ADULT.—Length of forewing 2–2.5 mm. Color black, legs annulate, forewing with a narrow transverse white band, and small white spots

apically. Male genitalia: ninth segment developed into a large rounded flap dorsolaterally; clasper short, rather quadrate in lateral view, with a small basoventral lobe; posterior margin developed into numerous short spurs, ventral one heaviest and curving mesad; tenth tergum a simple, broad flap, apex slightly bilobed and asymmetrical; aedeagus



FIGURES 159–171.—*Ochrotrichia* (*O.*) *spinosissima* Flint: 159, male genitalia, lateral; 160, male genitalia, dorsal; 161, aedeagus, dorsal; 162, female eighth sternum, ventral; 163, bursa copulatrix, ventral. *O.* (*O.*) *ponta*, new species: 164, male genitalia, lateral; 165, aedeagus, dorsal; 166, male genitalia, dorsal; 167, female eighth sternum, ventral; 168, bursa copulatrix, ventral. *O.* (*O.*) *brayi*, new species: 169, male genitalia, lateral; 170, aedeagus, dorsal; 171, male genitalia, dorsal.

long, with 2 apical processes, 1 heavily sclerotized and gradually decurved, the other membranous and tubular. Female genitalia: eighth sternum with an elongate tongue-like apicomesal process; rods attached apicolaterally; bursa copulatrix expanded apically with a large central opening and a pair of apicolateral earlike lobes.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Dominica, Carholm Estate, 7 Feb. 1965, W. W. Wirth, 3♂. Clarke Hall, 11–20 Jan. 1965, W. W. Wirth, 1♂. Pont Casse, 2.5 miles east, W. W. Wirth, 16 Jan. 1965, 1♀.

BIOLOGY.—Nothing is known of the biology of the species.

Ochrotrichia (*O.*) *brayi*, new species

FIGURES 169–171

This new species, like so many others in the genus, is not clearly related to any other described species although the simple aedeagus suggests a relationship with *O. marica* Flint and *O. lobifera* Flint. The rather simple tenth tergum with the heavy apical spine is unique.

ADULT.—Length of forewing 3 mm. Color brown. Male genitalia: ninth segment nearly quadrate, without a dorsolateral lobe; tenth tergum elongate, narrow, right side membranous especially subapically, left side heavily sclerotized, apex with a short, stout, black spine; clasper elongate with an apicodorsal lobe; black peglike setae on mesal face of apicodorsal lobe, and a few near ventral margin at midlength; aedeagus a long, slender tube with a small subapical tooth.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Freshwater Lake, 22 Feb. 1964, D. F. Bray, USNM Type 69903.

BIOLOGY.—Nothing is known of the biology of this species.

Ochrotrichia (*O.*) *ponta*, new species

FIGURES 164–168

The species would seem to be related to *O. insularis* Mosely, from which it differs in possessing a simple tenth tergum and a divided aedeagus.

ADULT.—Length of forewing 2–3 mm. Color fuscus, antennae cream colored, forewing with a narrow, transverse white band at midlength, apically with several small white spots. Male genitalia: ninth segment with a large dorsolateral lobe; tenth tergum elongate, pointed, with a sclerotized band along the dorsolateral margins; clasper elongate with anterodorsal margin straight, hind margin shallowly bilobed, each lobe bearing a patch of dark peglike setae; aedeagus with apical half divided into 2 elongate tubules. Female

genitalia: eighth sternum with posterior margin bearing small mesal lobe, and a thin, projecting sclerite marked with a pair of crescentic dark marks; bursa copulatrix heavily sclerotized, streamlined, with an elongate central opening.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, .4 miles east, 27 April 1964, O. S. Flint, Jr., USNM Type 69904. Allotype, female: same data. Paratypes: same data, 11 ♂ 1 ♀; same, but 6 May 1964, 1 ♂; same, but 23 June 1964, 2 ♂; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 1 ♂; same, but 18 May 1964, 1 ♂ 1 ♀; Pont Casse, 1.7 miles east, 24 Mar. 1965, W. W. Wirth, 1 ♂; Pont Casse, 12–14 Oct. 1964, P. J. Spangler, 1 ♂; Freshwater Lake, 5–8 Nov. 1966, A. B. Gurney, 1 ♀; Mannett Gutter, 7 Mar. 1965, W. W. Wirth, 1 ♂.

BIOLOGY.—Adults of this species have been taken primarily near small, clear brooks, in which the larvae will probably be found.

Ochrotrichia (*Metrichia*) *campana*, new species

FIGURES 172–174

This and the following species are very closely related. In this species the dorsal lobe of the clasper is developed into a narrow spurlike process.

ADULT.—Length of forewing 2 mm. Color fuscus, antennae and legs paler. A pair of large pouchlike sacs, each filled with many modified setae, between sixth and seventh terga. Male genitalia: ninth sternum produced and rounded anteroventrally, with a heavily sclerotized dorsal lobe; a lightly sclerotized, elongate lobe dorsally extending posteriad between spinelike process arising from dorsolateral angles of ninth sternum; clasper broad, with a strong dorsolateral spur curving mesad, and a broad ventrolateral lobe; aedeagus with 2 subapical spines, a heavily sclerotized central tubule, and a slightly inflated basal half.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, D'leau Gommier, 16 March 1965, W. W. Wirth, USNM Type 69905.

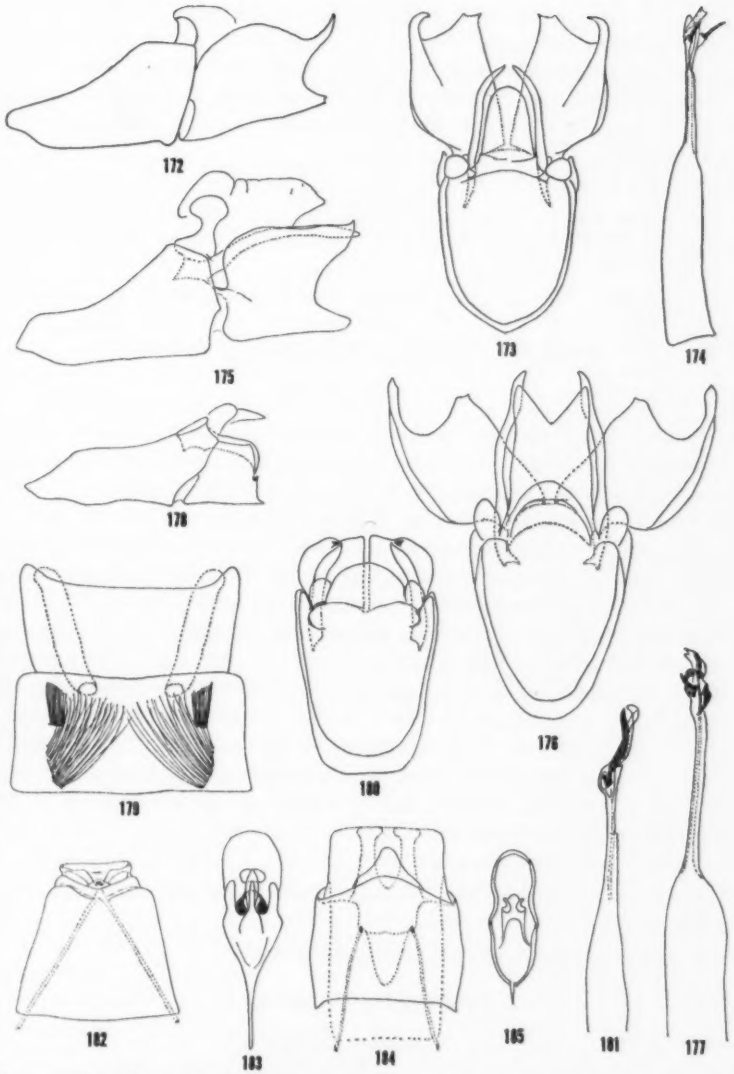
BIOLOGY.—Nothing is known of the biology of the species.

Ochrotrichia (*M.*) *similis*, new species

FIGURES 175–177

This species is extremely close to the preceding, differing primarily in the dorsal lobe of the clasper, which is broad in *O. similis* and narrow in *O. campana*. The pouches between terga six and seven also seem different in the two species.

ADULT.—Length of forewing 2.5 mm. Color in alcohol brown. A pair of small pouches between sixth and seventh terga; seventh



FIGURES 172–185.—*Ochrotrichia* (*Metrichia*) *campana*, new species, male: 172, genitalia, lateral; 173, genitalia, dorsal; 174, aedeagus, dorsal. *O.* (*M.*) *similis*, new species, male: genitalia, lateral; 176, genitalia, dorsal; 177, aedeagus, dorsal. *O.* (*M.*) *exclamationis*, new species, male: 178, genitalia, lateral; 179, fourth and fifth abdominal terga, dorsal; 180, genitalia, dorsal; 181, aedeagus, dorsal. *O.* (*M.*) species 1: 182, female eighth sternum, ventral; 183, bursa copulatrix, ventral. *O.* (*M.*) species 2: 184, female eighth sternum, ventral; 185, bursa copulatrix, ventral.

tergum with a dark, trianguloid mark mesally. Male genitalia: ninth segment produced and rounded anteroventrally, with a dumbell-shaped dorsal lobe; apex of lightly sclerotized dorsal lobe with a V-shaped mesal excision; dorsolateral spine long, and slender; clasper, with broad, dorsal and ventral lobes; aedeagus with 2 subapical spines a central tubule, and enlarged base.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Boiling Lake, 19 Nov. 1964, P. J. Spangler, USNM Type 69906. Paratype: Guadeloupe, altitude 3000 ft., 30 July, A. Busck, 1♂.

BIOLOGY.—The immature stages and breeding sites are unknown.

Ochrotrichia (*M.*) *exclamationis*, new species

FIGURES 178–181

This species is not clearly related to any other in the subgenus. The long subapical spine of the aedeagus, the short clasper, and the pouches and hair tufts of the abdomen are all extremely distinctive.

ADULT.—Length of forewing 2 mm. Color fuscus, forewing irregularly mottled with silvery patches of hair. A pair of elongate internal tubes arising ventrally between fourth and fifth segments, extending the length of fifth segment; a pair of black, scale-filled sacs posteroventrally on fourth segment; a pair of large, dorsal hair tufts basally on fourth segment. Male genitalia: ninth segment with anteroventral margin extended and rounded; dorsal lobe short, rounded, lightly sclerotized; dorsal lobe rounded, short, and indistinct; dorsolateral spine broad, curved ventrad; clasper short and broad, with a small mesal spine along posterior margin; aedeagus with a long ribbon-like subapical spine, a twisted, lightly sclerotized process on right, an internal tubule, and expanded base.

LARVA, PUPA, CASE.—Unknown.

MATERIAL.—Holotype, male: Dominica, Clarke Hall, cocoa trail, 16 Feb. 1965, W. W. Wirth, USNM Type 69907.

BIOLOGY.—The biology is totally unknown.

Ochrotrichia (*M.*) species 1

FIGURES 182–183

There are two females of the subgenus *Metrichia* in the collections. On the basis of coloration, they are probably not the female of *O. exclamationis*, but there is no way to assign these to either *O. campana* or *O. similis*.

ADULT.—Length of forewing 2–2.5 mm. Color black, antennae and legs paler. Female genitalia: eighth sternum with a thin apical collar

beyond which extends a thinner, more membranous collar that bears mesally a dark point to which are attached long, internal rods; bursa copulatrix with a short basal stem, a broad rounded apical lobe, and a complex of central structures; ninth and tenth segments extremely long and extensile.

MATERIAL.—Dominica, Freshwater Lake, 14 April 1964, O. S. Flint, Jr., 1♀; Pont Casse, .4 miles east, 16 May 1964, O. S. Flint, Jr., 1♀.

Ochrotrichia (*M.*) species 2

FIGURES 184–185

On the basis of size and coloration, these are possibly the females of *O. exclamationis*. The structure of the eighth sternum is extremely distinctive.

ADULT.—Length of forewing 1.5–2 mm. Color silver gray, forewing with several transverse bands of white hair, antenna pale basally, dark apically. Female genitalia: eighth sternum with posterior margin slightly lobate mesally; with an internal posteromesal sclerite giving rise to internal rods from its lateral angles and with its posterior margin developed into a projecting mesal lobe; eighth segment dorsally with a pair of knobbed submesal processes; bursa copulatrix ovoid, with lateral margin bandlike and a central complex.

MATERIAL.—Dominica, Pont Casse, 2.5 miles east, 16 Jan. 1965, W. W. Wirth, 3♀.

Family LEPTOCERIDAE

The leptocerids are worldwide in distribution but perhaps a little more abundant and diverse in the warmer regions than in the colder. This is probably because they are one of the few families that have successfully invaded the larger, warmer lakes and slowly flowing rivers.

The larvae construct cases that are generally tubular and made of sand or organic matter although a few genera hollow-out twigs or utilize discarded cases of other species. Pupation takes place within the larval case, which has been firmly attached to some object in the substrate.

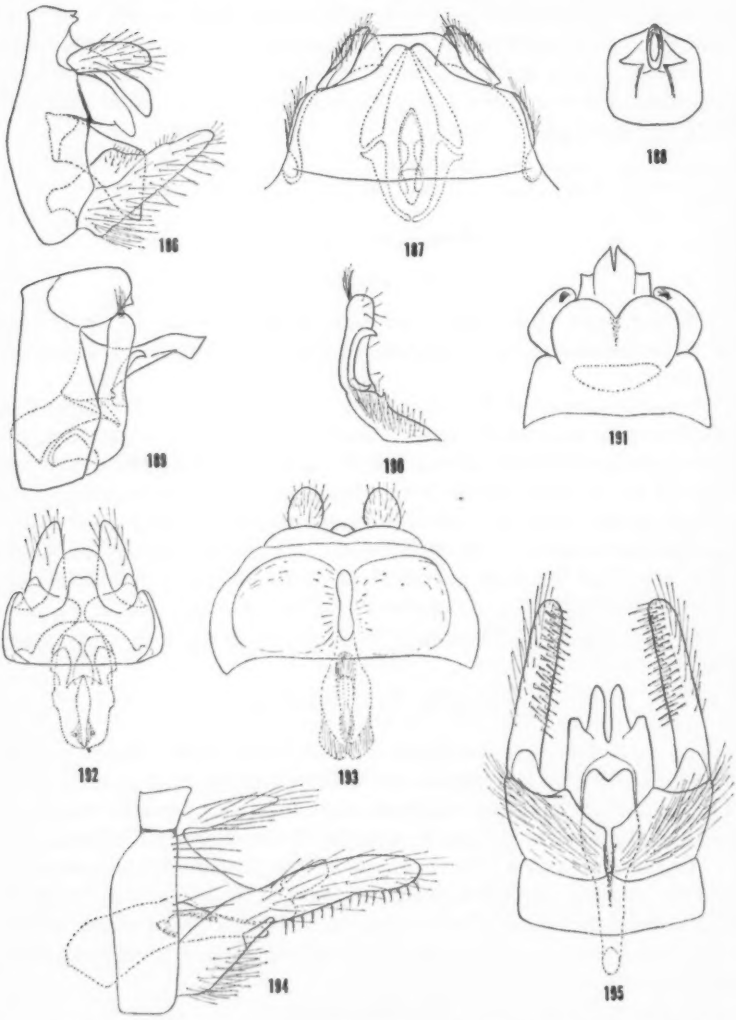
Key to Genera

LARVAE

1. Metanotum with large sclerotized plates . . . . . **Atanatolica**
   Metanotum wholly membranous 2
2. Anal proleg ventrally with linear rows of hairs and spines . **Brachysetodes**
   Anal prolegs without hairs and spines ventrally . . . . . **Oecetis**

ADULTS

1. Forewing with M unbranched from base to apex . . . . . **Oecetis**
   Forewing with M branched near wing margin 2



FIGURES 186–195.—*Oecetis pratti* Denning: 186, male genitalia, lateral; 187, female genitalia, ventral; 188, internal structure of female seventh segment. *Brachysetodes insularis*, new species: 189, male genitalia, lateral; 190, clasper, posterior; 191, male genitalia, dorsal; 192, female genitalia, ventral. *Atanatolica dominicana*, new species: 193, female genitalia, ventral; 194, male genitalia, lateral; 195, male genitalia, ventral.

2. Hindwing with anal area expanded, wing broader than forewing.
Atanatolica

Hindwing with anal area compressed, wing narrower than forewing.
Brachysetodes

Genus *Oecetis* McLachlan

Oecetis McLachlan, 1877, p. 329. [Type-species: *Leptocerus ochraceus* Curtis, 1825, by subsequent designation of Ross, 1944.]

A single species of this worldwide genus has been found on Dominica. The larvae of this genus generally make rather bulky cases of plant material although some make more trim cases of sand grains. The long mandibles and palpi of the larvae are apparently correlated with a trend toward predation.

Oecetis pratti Denning

FIGURES 186–188, 196–201

Oecetis pratti Denning, 1947, p. 656.—Wolcott, 1950, p. 93.—Flint, 1964b, p. 62.—Fischer, 1966, p. 140.

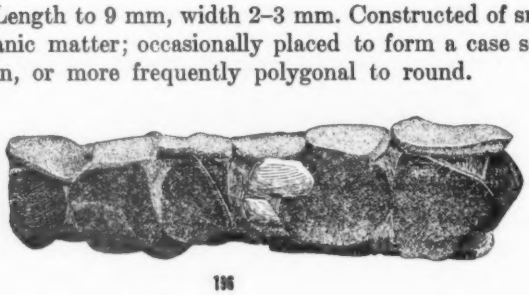
The species has heretofore been known only from Puerto Rico although there are closely related, if not identical, species in Florida and Peru. The Dominican specimens differ slightly from the Puerto Rican in possessing a more elongate tenth tergum.

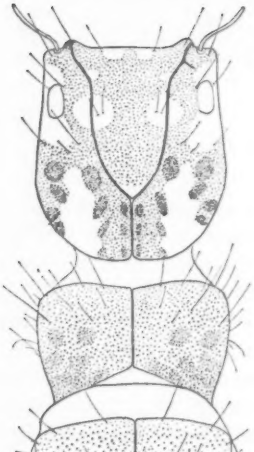
ADULT.—Length of forewing 7–8 mm. Color brown, forewing with small tufts of black hair where Rs branches and just ventrad on M, where R_{2+3} and Cu_1 branch, and where the branches of Cu meet the wing margin. Male genitalia: ninth segment narrow, slightly widened laterally; cercus ovate about twice as long as broad; tenth tergum rodlike, longer than cerci, slightly expanded apically; a conical process slightly ventrad of tenth tergum; clasper broad basally, tapering to a blunt apex, inner margin near apex bearing short, stout, recurved setae, basomesal lobe with short setae; aedeagus tubular, slightly enlarged apically, internally with a pair of angular sclerites. Female genitalia: eighth sternum without strongly sclerotized marks; bursa copulatrix elongate; seventh segment internally with a hollow, more-or-less spherical structure.

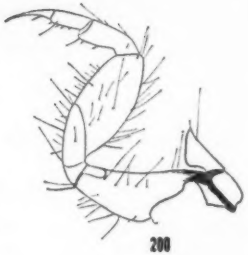
LARVA.—Length to 5 mm. Head mottled yellow and brown; thoracic notae more uniformly brown. Foreleg short and broad, mid- and hind-legs slender, hindleg especially long, with tibia and tarsus divided at midlengths. Spacing humps well developed; gills single; lateral line lacking. Ninth tergum with 3 pairs of long, black setae. Anal claw with 3 small accessory teeth in a transverse row.

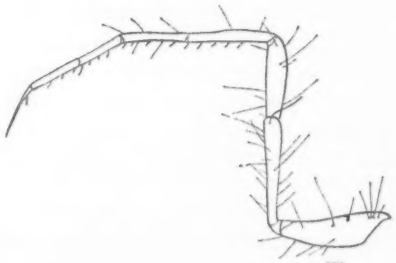
PUPA.—Unknown.

CASE.—Length to 9 mm, width 2–3 mm. Constructed of small bits of flat organic matter; occasionally placed to form a case square in cross-section, or more frequently polygonal to round.









FIGURES 196–201.—*Oecetis pratti* Denning, larva: 196, case, lateral; 197, head and thorax, dorsal; 198, left mandible, dorsal; 199, right mandible, ventral; 200, foreleg, posterior; 201, hind leg, posterior.

MATERIAL.—Dominica, Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., 1 ♂, 30 larvae; same, but 28 April 1964, 1 ♀; same, but 29 April 1964, 6 larvae; same, but 18 May 1964, 1 ♀; same, but 16 June 1964, 2 ♀; Pont Casse, .4 mile east, 8 May 1964, O. S. Flint, Jr., 1 larva; same, but 15 June 1964, 2 ♀; Pont Casse, .5 mile east, 27 Jan. 1965, J. F. G. and T.M. Clarke, 1 ♂ 1 ♀; Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr., 1 ♀; Pont Casse, 12–14 Oct. 1964, P. J. Spangler, 5 ♀; same, but 23 Nov. 1964, 1 ♀; same, but 8–13 Oct. 1966, A. B. Gurney, 1 ♀; Freshwater Lake, 22 Feb. 1964, D. F. Bray, 1 ♂; Clarke Hall, 14 Oct. 1966, E. L. Todd, 1 ♀.

BIOLOGY.—The larvae were found in pools and other slowly flowing sections of two small mountain streams. On occasion they were found to be abundant, crawling over rocks and leaves in a favored site.

Genus *Brachysetodes* Schmid

Brachysetodes Schmid, 1955, p. 134. [Type-species: *Brachysetodes trifida* Schmid, 1955, by original designation.]

I am placing with some hesitation the following species in the Chilean genus *Brachysetodes*. Although venation is the same in the Dominican species and the type-species, the plan of the male genitalia seems quite different. Perhaps the immature stages of the Chilean species when they are discovered will show that the Dominican species is not congeneric.

The larvae are quite similar to those of *Leptocella* in many characteristics; however, the brushes of hair and spines on the ventral portion of the anal prolegs are unique.

Brachysetodes insularis, new species

FIGURES 189–192, 202–208

This species seems to be closest to *B. bifida* Schmid, from which it differs in the round cerci and in the shorter clasper with a differently shaped appendage.

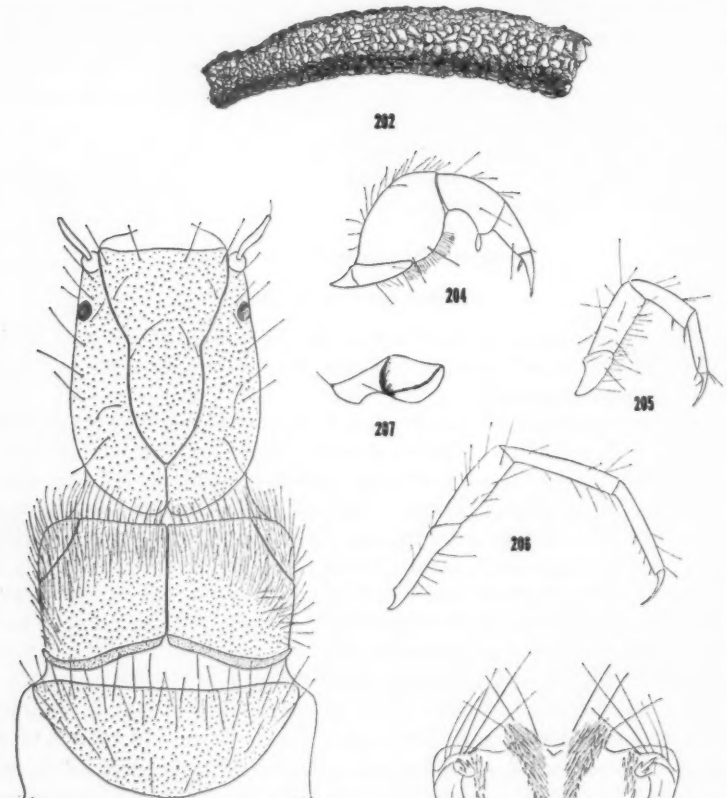
ADULT.—Lengths of forewing 4–5 mm. Color brown, forewing golden, with interspersed brown spots roughly arranged in transverse rows. Male with 2 branches of M in forewing, female with 3 branches. Male genitalia: cercus almost spherical, with a small apicoventral point, cerci broadly united dorsomesally; tenth tergum elongate, with thin lateral expansion; clasper terete, nearly upright, apex with a cluster of setae, posterior face with a hooked process; aedeagus tubular, with an apicoventral liplike expansion. Female genitalia: cerci well developed, united ventromesally by a semicircular plate; bursa copulatrix with apical supports, and central keyhole-like opening.

LARVA.—Length to 6 mm. Sclerites pale yellow brown. Mandibles with 3 apical teeth; maxillary palpi short. Pronotum with many setae on anterior half, anterolateral angles set off by sutures. Metanotum with a group of setae anterolaterally; sternum with a transverse row of about 20 setae. Spacing humps present, lateral ones poorly developed. A few single gill filaments on basal abdominal segments. Ninth tergum with 3 pairs of long setae. Mesal portion of anal prolegs with a linear brush of hairs margined laterally by spinelike setae, another row of spines mesad of claw.

PUPA.—Unknown.

CASE.—Length to 6 mm. Evenly tapered and curved, made of small sand grains.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., USNM Type 69908. Allotype, female: same data. Paratypes: same data, 22♂ 3♀; same, but 27 April 1964, 1♂; same, but 28 April 1964, 8♂ 5♀; same, but 2 May 1964, 1♀; same, but 9 May 1964, 15♂ 5♀; same, but 16 June 1964, 2♂; same, but 25 June 1964, 2♂; same, but 27 June 1964, 1♂ 1♀; Ponte Casse, .4 mile east, 7 May 1964, O. S. Flint, Jr., 1♂; Pont Casse,



FIGURES 202–208.—*Brachysetodes insularis*, new species, larva: 202, case, lateral; 203, head and thorax, dorsal; 204, foreleg, posterior; 205, midleg, posterior; 206, hind leg, posterior; 207, foretrochantin, lateral; 208, anal prolegs, ventral.

1.3 miles east, 10 May 1964, O. S. Flint, Jr., 2♂; Pont Casse, 1.7 miles east, 12 March 1965, W. W. Wirth, 1♂; Pont Casse, 2.2 miles east, 2 May 1964, O. S. Flint, Jr., 1♂; Pont Casse, .5 mile south, 22–24 July 1963, O. S. Flint, Jr., 1♀; Pont Casse, 1.5 miles north, 12 Feb. 1965, W. W. Wirth, 3♂ 3♀; Brantridge, 30 April 1964, O. S. Flint, Jr., 1♂; D'leau Gommier, 15 March 1965, W. W. Wirth, 1♂; same, but 16 March 1965, 2♂; Freshwater Lake, 2 Oct. 1964, P. J. Spangler, 1♀; Guadeloupe, 4000 feet altitude, 30 July, August Busck, 1♀. Other: Pont Casse, 1.6 miles west, 29 April 1964, O. S. Flint, Jr., 4 larvae,

BIOLOGY.—The larvae were found sparsely in a slowly flowing pool of a small mountain stream. The adults were taken mostly in the daytime when they were easily beaten from the vegetation surrounding the stream.

Genus *Atanatolica* Mosely

Atanatolica, Mosely, 1936, p. 85. [Type-species: *Mystacides brasilianus* Brauer, 1865, by original designation.]

I place the Dominican species in this genus primarily because of the close similarity of the male genitalia to the type-species. There are a few differences in the venation in the two species: in *A. dominicana*, fork 1 in the forewing is petiolate, and there is no crossvein in the hindwing between R_{2+3} and R_{4+5}.

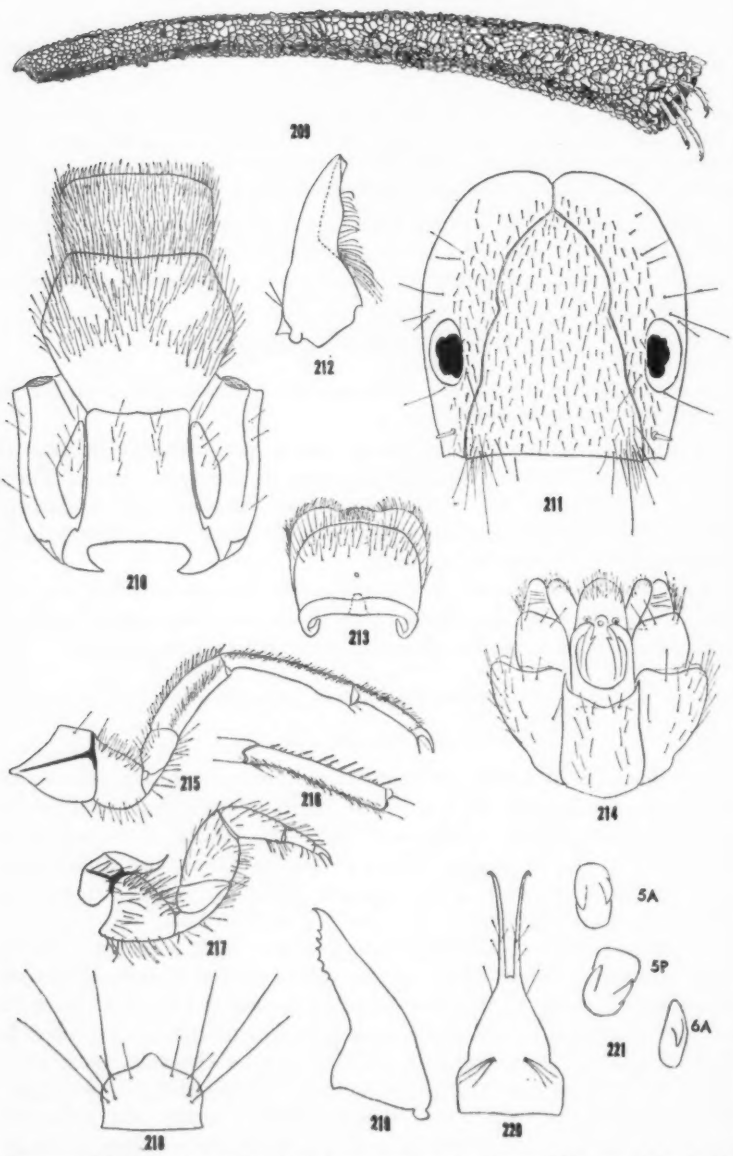
The larvae and pupae of the genus are described herein for the first time. They are especially unusual because they spend most of their time out of water crawling and pupating on moist rocks.

Atanatolica dominicana, new species

FIGURES 193–195, 209–221

On the basis of male genitalia, this species is closely related to *A. brasiliana* (Brauer), from which it differs in the apicolateral angles of the tenth tergum, which are finger-like rather than truncate; the apex of the aedeagus, which is bilobate; and the apicomesal angle of the basal part of the clasper, which is obliquely truncate. There are also differences in the venation as stated above.

ADULT.—Length of forewing: male 7–9 mm, female 5–6 mm. Head, basal antennal segment with a cream-colored middorsal line, remainder of antennae black with white annulae, forewing brown (darker in female) with apex, apical fringe, and posterior margin cream colored. Male genitalia: ninth segment annular; cercus elongate, narrowing apically; tenth tergum with paired apicodorsal finger-like appendages, and apicolaterally with short digitate lobes; clasper with enlarged basal section whose apicomesal angle is obliquely truncate, a small appressed appendage posteriorly, apical portion with many spinelike setae on mesal surface; aedeagus with an elongate, bilobed, apical lip. Female genitalia: cerci rounded; ventrally to cerci a thin, ventrally



FIGURES 209–221.—*Atanatolica dominicana*, new species, larva: 209, case, lateral; 210, thorax, dorsal; 211, head, anterior; 212, mandible, dorsal; 213, labrum, dorsal; 214, maxillolabium, ventral; 215, hind leg, posterior; 216, hind tibia, dorsal; 217, foreleg, posterior. Pupa: 218, labrum, dorsal; 219, mandible, anterior; 220, apical processes, dorsal; 221, hook-plates, dorsal.

directed shelf best seen in lateral aspect; bursa copulatrix well developed with apicomesal supports, and an elongate central opening.

LARVA.—Length to 9 mm. Head brown, paler anteriorly and around eyes; with many short, pale, secondary setae. Mouthparts as shown; mandibles symmetrical. Thoracic notae brown. Foreleg short and broad, mid- and hindlegs longer; tibia of mid- and hindlegs with a row of spinelike setae anteriorly. Metasternum with lateral groups of 9–12 setae. Spacing humps low. Sternum of first abdominal segment with a pair of short 2 or 3 branched gills; second sternum with a pair of very short protuberances. No lateral line. Eighth segment with a lateral line of 12 small sclerotic points. Ninth tergite with 2 pairs of dark setae. Anal claw with a single large dorsal accessory tooth.

PUPA.—Length 7 mm. Mandibles and labrum as shown. Frons with 2 pairs of long setae; 2 setae between eye and base of mandible; 1 pair between antennae; 4 setae on basal antennal segment. Mesonotum with many setae. Antennae wound around apex of abdomen many times. No tarsal hair fringe. Hook-plates anteriorly on segments 3–6, posteriorly on 5; plates 3, 4, and 5A similar, 6A slightly smaller. Apical processes slightly sclerotized, tip curved sharply dorsad.

CASE.—Length 15 mm. Evenly tapering and conical; made mostly of sand grains, sometimes with large wholly silken areas. Posterior end dorsally with a projecting, hoodlike silken structure, ventral part of hood open to interior.

MATERIAL.—Holotype, male: Dominica, Pont Casse, .4 miles east, emerged 11 May 1964, O. S. Flint, Jr., USNM type 69909. Allotype, female: same data. Paratypes: same, but emerged 9 May 1964, 1♂1♀; same, but emerged 10 May 1964, 1♂; same, but 16 May 1964, 1♂; same, but emerged 18 May 1964, 1♂1♀; same, but 15 June 1964, 2♂1♀; same, but 23 June 1964, 7♂2♀; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 1♀; Pont Casse, 1.6 miles west, 9 May 1964, 1♀; same, but 27 June 1964, 2♀. Other: Pont Casse, .4 miles east, 8 May 1964, O. S. Flint, Jr., many larvae, ♂♂♀♀ pupae; same, but 20 May 1964, many larvae; same, but 12 June 1964, many larvae.

BIOLOGY.—This species has the most unusual biology of any species of Trichoptera found on Dominica. The larvae and pupae are basically terrestrial, although they do not show any of the morphological adaptations that would be expected for this environment. The immature stages were found around a single small mountain stream that is incised into the rock to a depth of three feet. The larvae were actively crawling over the rock walls and boulders above the level of the water up to three or four feet away. The substrate was moist, and sometimes with a flowing film of water, but never were the larvae actually submerged. The habitat was on occasion so dry that I doubt very much if there could have been free water between the larva and its case. The pupae were tightly attached to rocks in the same habitat, generally in clusters and in some sort of protected niche.

Family Calamoceratidae

The calamoceratids are a rather small family, the majority of whose numbers are found in the tropical regions of the world. Many of the species are brightly colored and are most active in the daytime.

The immature stages are all case bearers, many making flat cases of leaf fragments, some cylindrical cases of sand, and others hollowing-out a twig. They are generally inhabitants of lotic waters but may congregate in masses of organic trash in slowly flowing pools in the stream.

Genus *Phylloicus* Müller

Phylloicus Müller, 1880, p. 131. [Type-species: *Phylloicus major* Müller, 1880, designated by Flint, 1964b.]

The genus is primarily Neotropical in distribution but does enter the southwestern United States. Most of the species are diurnal and are marked with orange and black.

The larvae construct large, flat cases of leaf fragments. The immature stages were described by Flint (1964b).

Phylloicus monticolus, new species

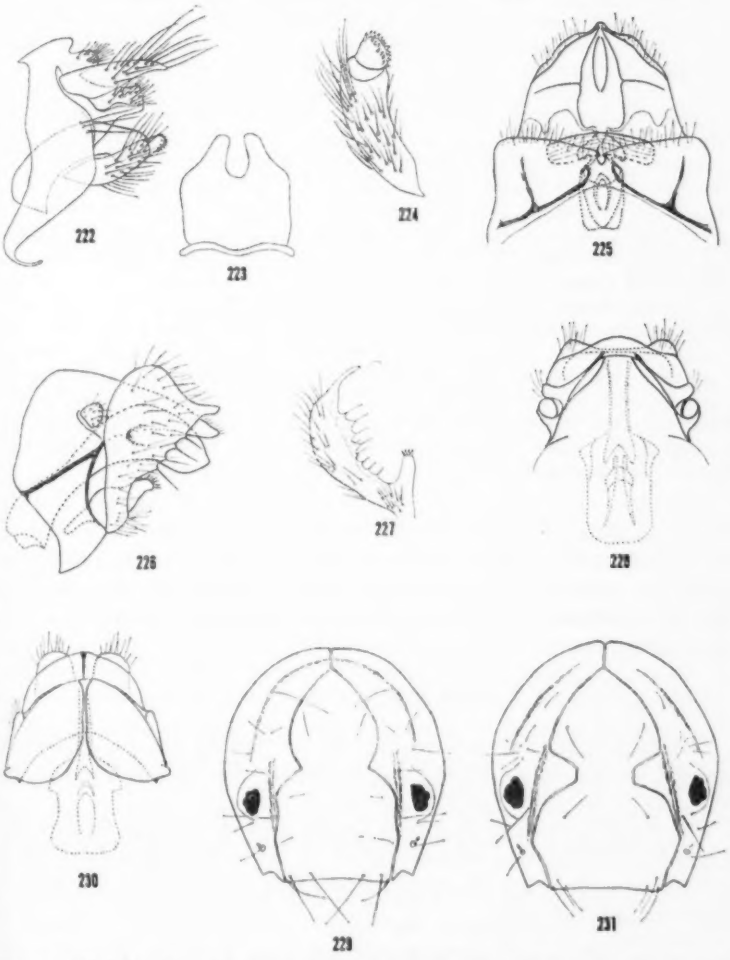
Figures 222–225

This species is most closely related to *P. lituratus* Banks from Columbia and Panama. From this species it differs in its coloration, and in the male genitalia by the shorter, broader cercus and broadened apical segment of the clasper.

Adult.—Length of forewing 8–11 mm. Color basically blue black, marked with orange as follows: pronotum, head and thorax ventrally, femora, and middle tarsi; forewings with two pale pinkish bands, one slightly beyond anastamosis, other basad, and longitudinal stripes basally in cells Cu_2 and 2A. Male genitalia: eighth sternum produced and bifid apically; ninth segment produced ventrally into a sclerotized band articulating with eighth sternum; tenth tergum with a hirsute projection mesally at union with ninth tergum, with a ventrolateral flange, apically truncate; cercus broad basally, tapering to an apical point, slightly longer than tenth tergum; clasper with basal segment cylindrical, apical segment broad and short, with apical peglike setae; aedeagus tubular, slightly C-shaped. Female genitalia: eighth sternum incised mesally, with a heavy brace along anterior margin and sublaterally; ninth sternum with ribbon-like anteromesal sclerites, and a transverse ridge at midlength, basomesally a transverse, striated sclerite; cercus united to tenth segment, very small; bursa copulatrix with laterally expanded, posterior supports, bursa with an A-shaped central structure.

LARVA.—Length to 14 mm, width 2.5 mm. Sclerites brown; head covered with small spicules, except for posterior and paler muscle scars. Structurally identical to *P. pulchrus;* except for inner surface of forecoxae which bears 6–7 setae (10–12 in *P. pulchrus*).

PUPA.—Length 9 mm, width 2.5 mm. Structurally similar to



FIGURES 222–231.—*Phylloicus monticolus*, new species: 222, male genitalia, lateral; 223, male eighth sternum, ventral; 224, clasper, posteroventral; 225, female genitalia, ventral, *Helicopsyche apicauda*, new species: 226, male genitalia, lateral; 227, clasper, posteroventral; 228, female genitalia, ventral; 229, larval head, anterior. *H.* species 1: 230, female genitalia, ventral. *H.* species 2: 231, larval head, anterior.

P. pulchrus except for hook-plates, which generally bear one more hook per plate.

CASE.—Length 15–20 mm, width 7–9 mm. Constructed of nearly circular pieces of leaf or wood, placed in dorsal and ventral rows.

MATERIAL.—Holotype, male: Dominica, 1.6 miles west of Pont Casse, 9 May 1964, O. S. Flint, Jr., USNM Type 69910. Allotype, female: same, but emerged 6 May 1964. Paratypes: same, but 24 April 1964, 2♂; same, but 28 April 1964, 2♂ 1♀; same, but emerged 2 May 1964, 1♀; same, but emerged 4 May 1964, 1♂; same, but emerged 6 May 1964, 1♀; same, but emerged 7 May 1964, 1♀; same, but 9 May 1964, 4♂; same, but emerged 9 May 1964, 1♂ 1♀; same, but emerged 17 May 1964, 1♂; same, but 16 June 1964, 2♂ 2♀; same, but 27 June 1964, 1♂; Pont Casse, .4 miles east, 6 May 1964, O. S. Flint, Jr., 1♀; same, but 15 June 1964, 1♂ 1♀; Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr., 1♂ 1♀; Pont Casse, 3 miles east, 15 Oct. 1966, E. L. Todd, 1♂; Pont Casse, 2 miles northwest, 3 May 1965, D. R. Davis, 1♂; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 3♂ 2♀; same, but 8 April 1964, 1♂; same, but 11 April 1964, 1♀; Pont Casse, 12–14 Oct. 1964, P. J. Spangler, 1♀. Other: Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., many larvae, pupae, and metamorphotypes; same, but 29 April 1964, many larvae, pupae, and metamorphotypes; Pont Casse, 2.2 miles east, 15 June 1964, O. S. Flint, Jr., 1 pupa; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 2 larvae, 2 pupae, 2 metamorphotypes; same, but 15 June 1964, 1 pupa; Brantridge, 9 May 1964, O. S. Flint, Jr., 3 larvae; Espagnole River east of Syndicate Estate, cascades on Mt. Diablotin, sta. 41, 26 Jan. 1964, H. H. Hobbs, Jr., 1 metamorphotype; Pont Casse, 3 miles north, 6 Oct. 1964, P. J. Spangler, 1 larva; Pont Casse, 2 miles northwest, 5 Oct. 1964, P. J. Spangler, 2 larvae.

BIOLOGY.—This species appears to be another of the species that breeds in the small streams at higher elevations in the mountains of Dominica. The larvae are generally found in the organic matter in the larger pools although they may be found in the cascades as well. The pupae especially are found in the cascades, attached to the underside of some of the larger stones.

Family HELICOPSYCHIDAE

The family Helicopsychidae, which are known as the snail-case makers, are the most diverse in the tropics although a few species range well into the temperate regions.

The snaillike cases constructed by the larvae are very distinctive. A number of these cases were described by the very early malacologists as Mollusca. They are found in flowing water, generally attached to large stones and boulders.

Genus *Helicopsyche* Siebold

Helicopsyche Siebold, 1856, p. 38. [Type-species: *Helicopsyche shuttleworthi* Siebold, 1856, designated by Flint, 1964b.]

This genus, which is primarily tropical, is found over the whole world with the exception of the northwestern Paleartic Region. All

the West Indian islands support one to three or four species, most of which appear to be endemic to one or adjacent islands.

The larvae and pupae inhabit cases made of sand grains in the form of a snail shell. The immatures have been described in detail a number of times (Betten 1934, Botosaneanu 1959).

Key to Species

LARVAE AND CASES

Sclerites pale yellowish, hind femur with more than 35 setae; case with umbilicus widely open . . . . . **H. apicauda**

Sclerites brown, hind femur with about 15 setae; umbilicus almost completely closed . . . . . **H. species 2**

FEMALES

Anterolateral angles of subgenital plate with cuplike invaginations . **H. apicauda**

Subgenital plate without anterolateral invaginations . . . . . **H. species 1**

Helicopsyche apicauda, new species

FIGURES 226–229

This species is another member of the *Helicopsyche haitiensis* group, and perhaps closest to *H. incisa* Ross. From this it differs in having the mesobasal lobe of the claspers directed more dorsad and in having the anterodorsal angle more rounded and the apicodorsal point narrower in the claspers.

ADULT.—Length of forewing 4–5.5 mm. Color pale brown. Basal abdominal segments reticulate ventrally; sixth sternum with a terete process expanded apically, about as long as sternum. Male genitalia: ninth segment rather wide ventrally; tenth tergum short, slightly arched, apex shallowly bilobate; clasper rounded anterodorsally, apical point elongate, posterior margin almost straight, mesobasal lobe elongate, directed slightly dorsad, and distinctly separated from clasper; aedeagus short and broad, especially apically. Female genitalia: subgenital plate conical, extending almost as far posteriad as cerci, lateral margin sclerotized with anterolateral angles bearing a cuplike pocket; cercus short, ventral plate rounded apically; bursa copulatrix with long slender posterior supports, internally with 2 flattened plates.

LARVA.—Length (straightened) about 6 mm. Sclerites pale yellowish. Head with many small spicules frontally; a slight ridge from eyes to posterior of frontoclypeal suture, ridge well separated from suture, which is indented to a point at midlength. Pronotum with anterior margin and anterior third bearing many pale, bladelike setae. Rather hairy in general; posterior femur bearing about 36 setae.

PUPA.—Length about 5 mm. Mandibles sickle shaped without inner teeth. Hook-plates anteriorly on segments 3–6, posteriorly on

5; anterior plates with 2 obliquely placed hooks on each, posterior plate with large lateral and a small mesal hook. Apical process short and rodlike, each with 4 long setae.

CASE.—Diameter 3–4 mm, height 1.5–2 mm. Made of sand grains in a rather flattened spiral. About 2½ whorls; umbilicus widely open. Anal aperture slightly eccentric and often projecting slightly.

MATERIAL.—Holotype, male: Dominica, Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., USNM Type 69911. Allotype, female: same data. Paratypes: Pont Casse, 1.6 miles west, 28 April 1964, O. S. Flint, Jr., 1 ♀; same, but 9 May 1964, 1 ♂ 2 ♀; same, but 27 June 1964, 1 ♀; Pt. Lolo, .5 miles west, 1600′, 19 Feb. 1965, J. F. G. and T. M. Clarke, 1 ♂; Pont Casse, .4 miles east, 21 April 1964, O. S. Flint, Jr., 1 ♂; same, but 27 April 1964, 1 ♀; same, but 6 May 1964, 1 ♀; same, but 15 June 1964, 1 ♂; same, but 23 June 1964, 1 ♂ 1 ♀; Pont Casse, .5 miles east, 1800′, 27 Jan. 1965, J. F. G. and T. M. Clarke, 1 ♂ 1 ♀; Pont Casse, 1 mile east, 1600′, 29 Jan. 1965, J. F. G. and T. M. Clarke, 1 ♀; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 2 ♂; same, but 18 May 1964, 1 ♂; same, but 26 May 1964, 1 ♂ 1 ♀; Pont Casse, 1.7 miles east, 24 March 1965, W. W. Wirth, 3 ♂ 2 ♀; Pont Casse, 2 miles east, 1500′, 20 Feb. 1965, J. F. G. and T. M. Clarke, 1 ♀; Pont Casse, 13 Jan. 1965, J. F. G. and T. M. Clarke, 1 ♂; same, but 23 Nov. 1964, P. J. Spangler, 1 ♂; Freshwater Lake, 5–8 Nov. 1966, A. B. Gurney, 1 ♀. Other: Pont Casse, .4 miles east, 8 May 1964, O. S. Flint, Jr., 11 larvae; same, but 20 May 1964, 10 larvae, 10 pupae; same, but 12 June 1964, 7 larvae, 6 pupae; same, but 25 June 1964, 10 larvae, 2 pupae; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 1 prepupa, 2 cases; Pont Casse, 1.6 miles west, 24 April 1964, O. S. Flint, Jr., 14 larvae.

BIOLOGY.—This species appears to be limited to the small mountain brooks, where on occasion it is quite plentiful. The larval population found in the brook at .4 miles east of Pont Casse has pale bladelike setae along the entire anterior margin of the pronotum, whereas the larvae from the other two brooks lack these setae except laterally. I am unable to find other differences between these populations, and so I am considering them to be all the same species.

Helicopsyche species 1

FIGURE 230

I have one female that appears to be a different species from the one above; however, I prefer to leave it unnamed until more examples are found.

The specimen differs most noticeably in lacking the cuplike pockets anterolaterally on the subgenital plate.

ADULT.—Length of forewing 5 mm. Color brown. Female genitalia: subgenital plate conical, lacking anterolateral modifications; cercus short, ventral plate rounded; bursa copulatrix with a pair of broad posterior supports, and an A-shaped central structure.

MATERIAL.—Dominica, Clarke Hall, 21–31 Jan. 1965, W. W. Wirth, 1 ♀.

Helicopsyche species 2

FIGURE 231

There is a distinct species on St. Lucia (and probably also on Grenada). Unfortunately, the genitalia of the only adult from St. Lucia were lost between preparation and illustration. Beyond the fact that the genitalia indicated that the species was quite distinctive, nothing more can be shown now. The larvae also seem to be distinct.

ADULT.—Length of forewing 4 mm. Color in alcohol, pale brown.

LARVA.—Length (straightened) about 6 mm. Sclerites brown. Head with a ridge mesad of eyes, bridging the indentation of the frontoclypeal suture, and another slight ridge posteriad of eyes; frontoclypeus broadly indented at midlength. Pronotum sparsely setate, with anterior margin bearing a row of pale, bladelike setae on all but the central portion. Hind femur with about 15 setae.

CASE.—Diameter 3–4 mm, height 2 mm. Made of sand grains, in typical snail-shell shape. About 3 whorls; umbilicus nearly closed. Anal aperture nearly central, spire moderately high.

MATERIAL.—St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 1♂ (without abdomen), 12 larvae, 3 pupae; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 34 larvae, 5 pupae.

BIOLOGY.—This species has been taken in two small, comparatively clear streams. They were attached to rocks in more slowly flowing pools in these streams.

Check List of the Antillean Trichoptera

The following list contains the names and distributions of the Trichoptera described or recorded from the Antilles (exclusive of Trinidad), together with references to their original descriptions. Junior synonyms described from the Antilles are listed in italics under the proper name. The locality in italics is the type-locality for the species.

RHYACOPHILIDAE

Atopsyche Banks
- cubana Flint, 1968b, p. 151. *Cuba*
- batesi Banks, 1938, p. 304. *Hispaniola*
- trifida Denning, 1948b, p. 113. *Puerto Rico*
- brachycerca Flint, 1968a, p. 10. *Jamaica*
- macrocerca Flint, 1968a, p. 12. *Jamaica*

GLOSSOSOMATIDAE

Cariboptila Flint
- orophila Flint, 1964b, p. 17. *Puerto Rico*
- jamaicensis Flint, 1968a, p. 16. *Jamaica*

Campsiophora Flint
pedophila Flint, 1964b, p. 15. *Puerto Rico*
arawak Flint, 1968a, p. 13. *Jamaica*

Protoptila Banks
dominicensis, new species. *Dominica*

PHILOPTAMIDAE

Wormaldia McLachlan
planae Ross and King, 1956, p. 64. Grenada, *Mexico* to Trinidad.

Chimarra Stephens
pulchra (Hagen), 1861, p. 298. *Cuba*
fraterna (Banks), 1924, p. 449.
braconoides (Walker), 1860, p. 179. *Hispaniola*
albomaculata (Kolbe), 1888, p. 175. *Puerto Rico*
luquillo Denning, 1947, p. 657.
argentella (Ulmer), 1906, p. 92. *Jamaica*
moesta (Banks), 1924, p. 449. *Cuba*
spinulifera Flint, 1968b, p. 151. *Hispaniola*
maldonadoi Flint, 1964b, p. 23. *Puerto Rico*
puertoricensis Flint, 1964b, p. 23. *Puerto Rico*
jamaicensis Flint, 1968a, p. 18. *Jamaica*
machaerophora Flint, 1968a, p. 20. *Jamaica*
dominicana, new species. *Dominica*
antilliana, new species. *Dominica*, St. Lucia
caribea, new species. *Grenada*, Trinidad

PSYCHOMIIDAE

Xiphocentron Brauer
cubana (Banks), 1941, p. 401. *Cuba*
haitiensis (Banks), 1941, p. 402. *Hispaniola*, Puerto Rico
borinquensis Flint, 1964b, p. 29. *Puerto Rico*
nesidion Flint, 1968a, p. 22. *Jamaica*
fuscum, new species. *Domiuica*
albolineatum, new species. *Dominica*

Cernotina Ross
caliginosa Flint, 1968a, p. 24. *Jamaica*
lutea, new species. *Dominica*
cadeti, new species. *St. Lucia*

Polyplectropus Ulmer
bredini, new species. *Dominica*, St. Lucia, Grenada

Polycentropus Curtis
nigriceps Banks, 1938, p. 301. *Cuba*
rosarius Kingsolver, 1964, p. 257. *Cuba*
domingensis Banks, 1941, p. 399. *Hispaniola*
zaneta Denning, 1947, p. 66. *Puerto Rico*
jamaicensis Flint, 1968a, p. 25. *Jamaica*
insularis Banks, 1938, p. 302. *Grenada*, Dominica

Antillopsyche Banks
wrighti Banks, 1941, p. 400. *Cuba*
tubicola Flint, 1964b, p. 30. *Puerto Rico*

HYDROPSYCHIDAE

Hydropsyche Pictet
- calosa Banks, 1938, p. 300. *Cuba*
- darlingtoni Flint, 1962, p. 23. *Cuba*
- cubana Flint, 1962, p. 24. *Cuba*
- domingensis Banks, 1941, p. 398. *Hispaniola*
- batesi Flint, 1962, p. 25. *Hispaniola*
- carinifera Flint, 1962, p. 27. *Hispaniola*
- antilles Ross and Palmer, 1948, p. 182. *Hispaniola*

Smicridea McLachlan
- comma Banks, 1924, p. 451. *Cuba*
- obesa Banks, 1938, p. 303. *Cuba*
- banksi Flint, 1967, p. 13. *Hispaniola*
  - *unicolor* Banks, 1938, p. 303, preoccupied
- completa Banks, 1941, p. 398. *Hispaniola*
- protera (Denning), 1947, p. 658. *Puerto Rico*
- alticola Flint, 1964b, p. 40. *Puerto Rico*
- grandis Flint, 1968a, p. 27. *Jamaica*
- minima Flint, 1968a, p. 27. *Jamaica*
- jamaicensis Flint, 1968a, p. 28. *Jamaica*
- cariba, new species. *Dominica*
- simmonsi, new species. *St. Lucia*
- grenadensis, new species. *Grenada*

Macronema Pictet
- gundlachi Banks, 1924, p. 454. *Cuba*
- matthewsi Flint, 1964b, p. 39. *Puerto Rico*

Leptonema Guerin
- poeyi (Banks), 1938, p. 299. *Cuba*
- insulanum Banks, 1924, p. 455. *Puerto Rico*, Venezuela
- archboldi, new species. *Dominica*
- albovirens (Walker), 1852, p. 76. Grenada, St. Vincent, Mexico to *Venezuela* and Trinidad

HYDROPTILIDAE

Leucotrichia Mosely
- tubifex Flint, 1964b, p. 44. *Puerto Rico*, Jamaica
- sarita Ross, 1944, p. 274. Grenada, *Texas* to Costa Rica

Zumatrichia Mosely
- antilliensis, new species, *Dominica*, St. Lucia, Grenada, Guadeloupe
- anomaloptera, new species. *Grenada*, St. Lucia, Dominica

Alisotrichia Flint
- hirudopsis Flint, 1964b, p. 47. *Puerto Rico*
- argentilinea Flint, 1968a, p. 34. *Jamaica*
- orophila, new species. *Dominica*
- lobata, new species. *Dominica*
- dominicensis, new species. *Dominica*
- wirthi, new species. *Dominica*
- septempunctata, new species. *Dominica*

Neotrichia Morton
- iridescens Flint, 1964b, p. 51. *Puerto Rico*, Jamaica, Dominica, St. Lucia
- alata Flint, 1968a, p. 37. *Jamaica*
- helcios Flint, 1968a, p. 38. *Jamaica*
- corniculans, new species. *Dominica*

Bredinia, new genus
dominicensis, new species. *Dominica*
Oxyethira Eaton
puertoricensis Flint, 1964b, p. 55. *Puerto Rico*, Jamaica
janella Denning, 1948a, p. 397. Puerto Rico, Jamaica, Dominica, St. Lucia, Grenada, *Florida* to Panama
neglecta Flint, 1964b, p. 57
azteca (Mosely), 1937, p. 165. Grenada, *Mexico* to Panama
cirrifera Flint, 1964b, p. 57. *Puerto Rico*, Jamaica, Dominica
tega Flint, 1968a, p. 44. *Jamaica*, Dominica
simulatrix Flint, 1968a, p. 43. *Jamaica*
jamaicensis Flint, 1968a, p. 44. *Jamaica*
Orthotrichia Eaton
cristata Morton, 1905, p. 75. Jamaica, *Illinois* to Florida
Hydroptila Dalman
martorelli Flint, 1964b, p. 52. *Puerto Rico*
medinai Flint, 1964b, p. 54. *Puerto Rico*
ditalea Flint, 1968a, p. 46. *Jamaica*
ancistrion Flint, 1968a, p. 48. *Jamaica*
antilliarum, new species. *Dominica*, St. Lucia
grenadensis, new species. *Grenada*
Ochrotrichia Mosely
marica Flint, 1964b, p. 60. *Puerto Rico*
gurneyi Flint, 1964b, p. 60. *Puerto Rico*
verda Flint, 1968b, p. 153. *Puerto Rico*
spinosissima Flint, 1964b, p. 58. *Puerto Rico*, Dominica
insularis Mosely, 1934, p. 163. *Jamaica*
caligula Flint, 1968a, p. 49. *Jamaica*
lobifera Flint, 1968a, p. 50. *Jamaica*
brayi, new species. *Dominica*
ponta, new species. *Dominica*
juana Flint, 1964b, p. 60. *Puerto Rico*
yalla Flint, 1968a, p. 50. *Jamaica*
campana, new species. *Dominica*
similis, new species. *Dominica*, Guadeloupe
exclamationis, new species. *Dominica*

LEPTOCERIDAE

Oecetis McLachlan
pratti Denning, 1947, p. 656. *Puerto Rico*, Dominica
inconspicua (Walker), 1852, p. 71. Puerto Rico, Jamaica, Cuba, *Georgia*, North and Central America
antillana (Banks), 1938, p. 298.
Leptocella Banks
cubana Banks, 1938, p. 229. *Cuba*, Jamaica
lewisi Flint, 1968a, p. 55. *Jamaica*
Brachysetodes Schmid
insularis, new species. *Dominica*, Guadeloupe
Atanatolica Mosely
dominicana, new species. *Dominica*

CALAMOCERATIDAE

Phylloicus Müller
chalybeus (Hagen), 1861, p. 285. *Cuba*
cubanus Banks, 1924, p. 445. *Cuba*
superbus Banks, 1938, p. 298. *Cuba*
iridescens Banks, 1941, p. 397. *Hispaniola*
pulchrus Flint, 1964b, p. 65. *Puerto Rico*
farri Flint, 1968a, p. 56. *Jamaica*
monticolus, new species. *Dominica*

ODONTOCERIDAE

Marilia Müller
wrighti Banks, 1924, p. 446. *Cuba*
scudderi Banks, 1924, p. 446. *Isle of Pines*
gracilis Banks, 1938, p. 297. *Hispaniola*
var. nigrescens, 1941, p. 397. *Hispaniola*
amnicola Flint, 1968a, p. 60. *Jamaica*

HELICOPSYCHIDAE

Helicopsyche Siebold
hageni Banks, 1938, p. 296. *Cuba*
cubana Kingsolver, 1964, p. 259. *Cuba*, Jamaica
comosa Kingsolver, 1964, p. 259. *Cuba*
lutea (Hagen), 1861, p. 271. *Hispaniola*
haitiensis Banks, 1938, p. 296. *Hispaniola*
ramosi Flint, 1964b, p. 72. *Puerto Rico*
minima Siebold, 1856, p. 38. *Puerto Rico*
umbonata Hagen, 1864, p. 128. *Jamaica*
ochthephila Flint, 1968a, p. 65. *Jamaica*
apicauda, new species. *Dominica*

Literature Cited

BANKS, NATHAN
1904. A list of neuropteroid insects, exclusive of Odonata, from the vicinity of Washington, D.C. Proc. Ent. Soc. Washington, vol. 6, pp. 201–217.
1913. Synopses and descriptions of exotic Neuroptera. Trans. American Ent. Soc., vol. 39, pp. 201–242.
1924. Descriptions of new neuropteroid insects. Bull. Mus. Comp. Zool., vol. 65, pp. 421–455.
1938. New West Indian neuropteroid insects. Rev. Entom., vol. 9, pp. 285–304.
1941. New neuropteroid insects from the Antilles. Mem. Soc. Cubana Hist. Nat., vol. 15, pp. 385–402.

BETTEN, CORNELIUS B.
1934. The caddis flies or Trichoptera of New York state. New York State Mus. Bull. 292, 576 pp.

BOTOSANEANU, LAZARE
1959. Helicopsyche margaritensis, trichoptere nouveau des Petites Antilles. *In* Studies on the Fauna of Curacao and other Caribbean Islands, vol. 9, pp. 61–68.

BRAUER, FRIEDRICH
1865. Zweiter bericht über auf der weltfahrt der Kais: Fregatte Novara gesammelten Neuropteren. Verh. Zool.-Bot. Gesel. Wien, vol. 15, pp. 415–422.
1870. Ueber Xiphocentron, eine neue Hydropsychidengattung. Verh. Zool.-Bot. Gesel. Wien, vol. 20, p. 66.

CURTIS, JOHN
1825. Trichoptera. *In* British entomology, vol. 2, pls. 51–98.
1834. Descriptions of some hitherto nondescript British species of mayflies of anglers. London and Edinburg Philos. Mag. Journ. Sci., vol. 4, pp. 120–125, 213–218.
1835. Trichoptera. *In* British entomology, vol. 12, pls. 530–577.

DALMAN, J. W.
1819. Nagra nya insekt-genera beskrifna. Svenska Vetenskapsaka. Hand., vol. 40, pp. 117–127.

DENNING, D. G.
1947. New Trichoptera from Puerto Rico. Ann. Ent. Soc. America, vol. 40, pp. 656–661.
1948a. New species of Trichoptera. Ann. Ent. Soc. America, vol. 41, pp. 397–401.
1948b. A review of the Rhyacophilidae (Trichoptera). Canadian Ent., vol. 80, pp. 97–117.

EATON, A. E.
1873. On the Hydroptilidae a family of Trichoptera. Trans. Ent. Soc. London, 1873, pp. 125–149.

EDWARDS, S. W.
1961. The immature stages of Xiphocentron mexico (Trichoptera). Texas Journ. Sci., vol. 13, pp. 51–56.

FISCHER, F. C. J.
1962. Polycentropodidae, Psychomyiidae. *In* Trich. Cat., vol. 3, 236 pp.
1963. Hydropsychidae, Arctopsychidae. *In* Trich. Cat., vol. 4, 225 pp.
1966. Leptoceridae (Pars 2). *In* Trich. Cat., vol. 7, 163 pp.

FLINT, O. S.
1962. Antillean species of Hydropsyche (Trichoptera). Bull. Brooklyn Ent. Soc., vol. 57, pp. 22–27.
1963. Studies of Neotropical caddis flies, I: Rhyacophilidae and Glossosomatidae (Trichoptera). Proc. U.S. Nat. Mus., vol. 114, pp. 453–478.
1964a. Notes on Nearctic Psychomyiidae with special reference to their larvae (Trichoptera). Proc. U.S. Nat. Mus., vol. 115, pp. 467–481.
1964b. The caddisflies (Trichoptera) of Puerto Rico. Univ. Puerto Rico, Agric. Exp. Sta., Techn. Pap. 40, 80 pp.
1967. Studies of Neotropical caddis flies, V: Types of species described by Banks and Hagen. Proc. U.S. Nat. Mus., vol. 123, no. 3619, 37 pp.
1968a. The caddisflies of Jamaica (Trichoptera). Bull. Inst. Jamaica, Sci. Ser. 19, 68 pp.
1968b. New species of Trichoptera from the Antilles. Florida Ent., vol. 51, pp. 151–153.

GUERIN-MENEVILLE, F. E.
1843. Trichoptera. Vol. IIIb *in* Iconographie due Regne Animal de Cuvier, pp. 395–397. Paris.

HAGEN, HERMANN
1861. Synopsis of the Neuroptera of North America. Smithsonian Misc. Coll., vol. 4, art. 1, xx+347 pp.
1864. Ueber Phryganidae-Gehause. Stettiner Ent. Zeit., vol. 25, pp. 1–144, 221–263.

KINGSOLVER, J. M.
1964. New species of Trichoptera from Cuba. Proc. Ent. Soc. Washington, vol. 66, pp. 257–259.

KOLBE, H. J.
1888. Die geographische verbreitung der Neuroptera und Pseudoneuroptera der Antillen nebst einer ubersicht uber die von Herrn Consul Krug auf Portoriko gesammelten arten. Arch. Naturg., vol. 54, pp. 153–178.

LEPNEVA, S. G.
1964. Caddisflies, vol. II, no. 1: Larvae and pupae of the trichopterous suborder Annulipalpia. Fauna U.S.S.R., n. s., no. 88, 562 pp.

LINNAEUS, C.
1767. Systema naturae, 12th ed., vol. 1, pt. 2, pp. 533–1327. Stockholm.

MCLACHLAN, ROBERT
1865. Trichoptera Britanica: A monograph of British trichopterous insects. Trans. Ent. Soc. London, ser. 3, vol. 5, pp. 1–184.
1871. On new forms, etc., of extra-European trichopterous insects. Journ. Linn. Soc. London, Zool., vol. 11, pp. 98–141.
1877. A monographic revision and synopsis of the Trichoptera of the European fauna, pt. 6, pp. 281–348.

MILNE, LORUS J.
1936. Studies in North American Trichoptera, 3, pp. 56–128. Cambridge, Mass.

MORTON, K. J.
1905. North American Hydroptilidae. New York State Mus. Bull. 86, pp. 63–75.

MOSELY, M. E.
1933. A revision of the genus *Leptonema*, 69 pp. British Museum (Natural History), London.
1934. New exotic Hydroptilidae. Trans. Roy. Ent. Soc. London, vol. 82, pp. 137–163.
1936. A revision of the Triplectidinae, a subfamily of the Leptoceridae (Trichoptera). Trans. Roy. Ent. Soc. London, vol. 85, pp. 91–130.
1937. Mexican Hydroptilidae (Trichoptera). Trans. Roy. Ent. Soc. London, vol. 86, pp. 151–190.

MÜLLER, FRITZ
1880. Sobre as casas construidas palas larvas de insectos Trichopteros da Provincia de Santa Caterina. Arch. Mus. Nac. Rio Janeiro, vol. 3 [for 1878], pp. 99–134.

NIELSEN, ANKER
1948. Postembryonic development and biology of the Hydroptilidae. Kgl. Danske Vidensk. Selskab, Biol. Skrift., vol. 5, 200 pp.

PICTET, F. J.
1834. Recherches pour servir a l'histoire et a l'anatomie des Phryganides, 235 pp. Geneva.

ROSS, H. H.
1938. Descriptions of Nearctic caddis flies (Trichoptera), with special reference to the Illinois species. Bull. Illinois Nat. Hist. Surv., vol. 21, pp. 101–183.

Ross, H. H.
1944. The caddis flies, or Trichoptera, of Illinois. Bull. Illinois Nat. Hist. Surv., vol. 23, pp. 1–326.
1949. A classification for the Nearctic species of *Wormaldia* and *Dolophilodes* (Trichoptera, Philopotamidae). Proc. Ent. Soc. Washington, vol. 51, pp. 154–160.

Ross, H. H., and King, E. W.
1956. *In* Ross, Evolution and classification of the Mountain caddis flies, pp. 62–64. Urbana: Univ. Illinois Press.

Ross, H. H., and Palmer, B. B.
1946. Hydropsyche antilles, an unusual new species from Santo Domingo (Trichoptera, Hydropsychidae). Proc. Ent. Soc. Washington, vol. 48, pp. 182–184.

Schmid, Fernand
1955. Contribution a la connaissance des Trichopteres Neotropicaux. Mem. Soc. Vaud. Sci. Nat., vol. 11, pp. 117–160.

Siebold, C. T. E.
1856. Wahre parthenogenesis bei schmetterlingen und bienen, vi+144 pp. Leipzig.

Stephens, J. F.
1829. A systematic catalogue of British insects, pt. 1, 416 pp. London.

Ulmer, Georg
1905. Zur kenntniss aussereuropaischer Trichopteren. Stettin Ent. Zeit., vol. 66, pp. 3–119.
1906. Neur beitrag zur kenntnis aussereuropaeischer Trichopteren. Notes Leyden Mus., vol. 28, pp. 1–116.
1911. Einige Südamerikanische Trichopteren. Ann. Soc. Ent. Belgique, vol. 55, pp. 15–26.
1962. Ein neuer name für Ecnomodes Ulm. (Trichoptera). Mitt. Deutsche Ent. Gesell., vol. 21, p. 5.

Walker, Francis
1852. Catalogue of the specimens of neuropterous insects in the collection of the British Museum, pt. 1: Phryganides-Perlides, 192 pp. London.
1860. Characters of undescribed Neuroptera in the collection of W. W. Saunders, Esq., F.R.S. Trans. Ent. Soc. London, ser. 2, vol. 5, pp. 176–199.

Wolcott, G. N.
1950. The insects of Puerto Rico. Journ. Agric. Univ. Puerto Rico, vol. 32, pp. 1–224.

Dominica Survey in the *Proceedings*

paper	*author*	*subject*	*year*	*volume*	*number*
1	Kier	Echinoids	1966	121	3577
2	Stone	Diptera: Anisopodidae, Bibionidae	1966	121	3578
3	Kirsteuer	Marine archiannelids	1967	123	3610
4	Allen	Hymenoptera: Tiphiidae	1967	123	3617
5	James	Diptera: Stratiomyidae	1967	123	3622
6	Jones and Schwartz	Bats of genus *Ardops*	1967	124	3634
7	Schwartz and Jones	Bats of genus *Monophyllus*	1967	124	3635
8	Ross	Intertidal Cirripedia	1968	125	3663

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